Queensland

Stock Identification Regulation 2005

Regulatory Impact Statement for SL 2005 No. 101

made under the

Chemical Usage (Agricultural and Veterinary) Control Act 1988
State Penalties Enforcement Act 1999
Stock Act 1915

Introduction

This Regulatory Impact Statement (RIS) outlines a proposal to amend the *Stock Identification Regulation 1985* to introduce mandatory implementation of the National Livestock Identification System (NLIS) in Queensland. (Note—NLIS is already in place in Queensland on a voluntary basis and backed by legislation. The change proposed is to make it mandatory in line with other states).

The development of significant subordinate legislation in Queensland requires the preparation of a RIS in accordance with the *Statutory Instruments Act 1992*. The RIS must be consistent with all applicable legislative requirements and protocols.

The purpose of a RIS is to—

- explain to the community the nature and extent of the problem to be addressed
- provide an outline of the rules of the preferred option to address the problem and the desired effect
- provide a statement of the alternatives to the regulation
- set out a statement of the benefits and costs associated with the identified alternatives

- provide a statement as to why the identified alternatives are not preferred.

The Queensland Government is also a party to the Competition Principles Agreement agreed to by the Council of Australian Governments (COAG) in 1995 (amended in 2000). The guiding principle of this agreement is that legislation should not restrict competition unless it can be demonstrated that—

- the benefits of the restriction to the community as a whole outweigh the costs
- the objective of the legislation can only be achieved by restricting competition.

In keeping with this agreement, the RIS also addresses these issues.

Executive summary

An enhanced mandatory National Livestock Identification System (NLIS) is to be introduced into Queensland in 2005. This is in line with similar programs already in place or being implemented in major livestock and livestock products exporting countries and which are being implemented in the other Australian states.

The NLIS is being implemented at a time of buoyant beef prices. Not only have producers benefited from relatively high beef prices, many (but not all) have seen property prices increase by as much as 300% in recent years. In addition, Queensland producers have recently secured a substantial windfall from the recent Bovine Spongiform Encephalopathy (BSE) cases in Canada and the United States (US). These gains alone could more than finance the implementation of NLIS in the State.

These recent gains highlight the consequences to the beef industry in this State of not implementing the NLIS system. Failure to implement NLIS or an equivalent system will create a major impediment to Australian producers continuing to export to the premium North Asian and North American markets. This is of particular importance to Queensland producers as the industry relies heavily on exports.

Queensland Department of Primary Industries and Fisheries (DPI&F) engaged Synergies Economic Solutions (Synergies) to undertake an

assessment of the costs and benefits to the Queensland beef industry of the NLIS.

Synergies have estimated that the NLIS system is expected to provide substantial benefits to the Queensland beef industry that will easily exceed the expected annual cost of the system (estimated to be approximately $32.5 million per annum) many times over. These benefits include—

- Maintaining access to premium markets which, over the past five years, have generated a premium of around 25% relative to lower value markets as market segmentation has become more pronounced. Applying this premium suggests that the annual cost to the Queensland beef industry of being excluded from these markets could be as high as $625 million. Given that the NLIS will cost the industry around $32.5 million per annum, so long as it delivers a price benefit of a little over 1%, it will more than pay for itself. In the context of preserving access to premium markets, there can be little doubt that this will be the case, especially as competition for entry into these markets becomes increasingly intense.
- Reducing the duration and intensity of disease outbreaks. A simplified model has indicated the expected annual savings to the Queensland beef industry from NLIS are estimated to be in the order of $85 million per annum.
- Improving farm management, which could yield (short term) gains in the order of $50 per beast. In the long run, however, these gains are likely to be eroded by our international competitors as they secure similar productivity improvements by also improving their own farm management techniques.
- Reducing the impact of stock theft (estimated between $1 million and $2.5 million per annum).

While it is important to recognise that these estimates have been made with high-level data and at times simplified models, it is clear that the gains to the beef industry are substantial.

It is true that the ongoing cost burden of NLIS falls predominantly on the beef production sector as opposed to other links in the value chain. Nevertheless, it is also the case that producers would be the main beneficiaries (which may be in the form of avoided losses) from the implementation of NLIS.

Indeed, Queensland producers have the most to gain from the implementation of NLIS due to the export orientation of the beef industry in this State. Additionally and importantly, the land that is currently utilised by Queensland beef producers has few alternative uses. This leaves the local beef industry and dependent rural communities particularly reliant upon continuing international acceptance of Queensland beef products. It also means that local producers are especially vulnerable to disease outbreaks. The simple reality is that Queensland livestock producers cannot afford not to implement a comprehensive NLIS system.

In the longer term (and perhaps even in the medium term), the local industry is likely to experience intensifying competition from exporting nations seeking to gain access to premium markets. Australia is in danger of lagging behind many competitors in implementing traceability systems at a time when producers such as Uruguay are securing access to the United States market.

In the longer term, exporters such as Brazil potentially pose a greater threat as it continues to increase its beef production and exports. Brazil may achieve foot and mouth disease (FMD) free status as early as 2007. The very high levels of Brazilian domestic consumption mean that producers will be able to target specific export markets with high value cuts. This potentially provides a competitive advantage for Brazilian producers that Australian exporters may struggle to match.

Consequently, in food safety conscious premium markets, failure to implement NLIS or even delaying implementation will leave our industry increasingly vulnerable in the dynamic and increasingly competitive global marketplace.

In summary, the NLIS system represents a relatively cost-effective insurance mechanism for the industry that yields very substantial dividends in the form of protecting our current market position in world markets, at least for the time being. Even though the magnitude of the current premiums that are being secured by producers cannot be expected to persist forever, it is clear that the beef industry can be expected to secure net benefits from implementing NLIS that exceed implementation costs many times over. Failure to implement NLIS risks significantly advancing the serious competitive threat posed by increasingly well positioned competitors.

Background

Biosecurity is a critical issue for Queensland's cattle industry. With 10.5 million cattle (and approximately 3.5 million calves born each year), the Queensland herd accounts for nearly half of Australia's beef production and is a major contributor to regional economies. The industry exports 80% of its beef (worth $2.6 billion annually) to many countries, with the two major markets being the United States of America and Japan.

The industry would be devastated in the event of an outbreak, or suspected outbreak, of diseases such as foot and mouth or mad cow disease. To counter this risk, Queensland must have an effective biosecurity policy with animal health prevention, surveillance and response systems. To maintain and enhance both national and international credibility, as well as to ensure technical effectiveness, an effective Queensland biosecurity policy must include—

(a) a practical and cost-effective mechanism for traceability of animals right through the supply chain from property of origin to intermediate destinations, slaughter or export to ensure rapid and complete tracing of all risk animals in the event of a disease emergency

(b) linkage to an effective animal health surveillance system that ensures continued market access.

Traceability is crucial in effectively responding to an outbreak of a livestock disease, restoring access to key markets and addressing food safety issues. Queensland and Australia have long been leaders in effective livestock identification and tracing systems. For cattle, these systems have been based on registration of holdings where cattle reside, allocation of property identification codes (PICs) and use of transaction ear or tail tags containing the PIC. Additionally, some states such as Queensland have used brands and earmarks, as well as movement documentation such as waybills.

These pre-existing systems are already largely mandatory and were sufficient for assisting in management of programs such as eradication of brucellosis and tuberculosis. However, to ensure continued market access, they now require upgrading to meet changing performance standards imposed by the advent of diseases such as BSE or mad cow disease.

In 2000 all states and territories introduced legislation to support the voluntary implementation of the NLIS but recognised that market changes may ultimately require a mandatory approach. During this period, the European Union (EU) increased requirements for access to their markets. At the same time, Japan and the US were also beginning to consider traceability as a requirement for entry into their markets.

Development and implementation of a national mandatory identification and tracing system covering all livestock (but initially beef and dairy cattle, and sheep), was agreed to by the Primary Industries Ministerial Council (PIMC) in April 2003, in response to a Council of Australian Governments' decision in 2002. The existing voluntary NLIS for cattle would form the basis of this mandatory whole-of-life identification and tracing system approach. PIMC decided that a NLIS (cattle) in northern Australia (including Queensland) should be implemented from 1 July 2005. Southern states have already commenced implementation. The Queensland NLIS Implementation Committee (QNIC) was established in December 2003 to assist in the implementation of NLIS in Queensland.

The NLIS will enable the whole-of-life tracing of animals from their property of birth through to the abattoir or port of export. It will build on existing livestock tracing systems by using electronic identification devices for individual cattle and recording stock movements in a national database.

The National Livestock Identification System

The Australian NLIS is a tracing system that includes paper- and electronic-based elements to record all movements of cattle (beef and dairy) from property of birth to any subsequent property of residence and ultimately to slaughter or live export.

The NLIS (cattle) involves the use of permanent devices [for example, ear tag or rumen bolus (capsule)] for the identification or 'tagging' of individual cattle. Embedded within each device is an electronic microchip that is linked to information on the individual animal including identification number, property of residence, disease status, and market eligibility. This information is held in the national database administered and funded through national transaction levies by Meat and Livestock Australia (MLA), the national service provider to the red meat industry.

MLA is responsible for the development, national operation and funding of the NLIS database, registration of devices, technological developments, training and communication. The system has the capacity to cover the national cattle herd of approximately 25 million cattle.

Each state government (including Queensland) is responsible for ensuring that the required infrastructure is in place to support NLIS. This includes the livestock property code database, related residue and disease status systems, and the necessary legislation and compliance systems.

Producers will be responsible for purchasing device applicators and NLIS devices (e.g. ear tags or rumen boluses) and applying these to individual cattle. If cattle are moved between properties or purchased from other locations, then electronic readers, computers, software and Internet access may be needed to supply the necessary information to the national database.

Feedlots, saleyards, meat processors and live exporters will have to provide infrastructure to read animals and inform the database of cattle movements. These facilities (depending on their throughput) will require readers, computers, specialised software and access to the Internet to upload to the national database. These businesses will be required to fund the purchase of this infrastructure.

During consultation, people from these stakeholder groups have expressed the view that such costs are 'part of doing business'. MLA will provide basic software packages free of charge to these facilities and producers. Sale yards have the largest infrastructure requirements under NLIS, as generally they do not possess the necessary systems or infrastructure needed to operate the system effectively.

Slaughterhouses have some minimal infrastructure requirements for NLIS, while cattle transporters have no formal requirements for NLIS infrastructure.

Sheep producers will be required to use cheaper non-electronic plastic tags to identify flocks and have no requirement for readers.

Authorising law

Proposed amendments to the Stock Identification Regulation are made under s.48 of the *Stock Act 1915*, which provides the Governor in Council the power to make regulations under this Act.

Policy objectives

It is the intention of the Queensland Government to introduce crucial enhancements to Queensland's current biosecurity arrangements through the mandatory implementation of the NLIS.

The Primary Industries Ministerial Council (PIMC) (2003) has summarised the objectives, and related benefits, for NLIS as—

> *The development and implementation of national livestock identification and tracing systems that will facilitate rapid and accurate trace-back and trace-forward of livestock across all jurisdictions for the primary purpose of underpinning consumer and market confidence in the safety and integrity of Australian livestock and livestock products. The systems would also have related benefits in respect of managing specific food safety risks, maintaining access to overseas markets, responding to animal major disease outbreaks and assisting producers with on-farm management decisions.*

The meat and livestock industry has expressed similar objectives for improved livestock identification in Australia.

The NLIS vision is

"to enhance the integrity and productivity of the Australian beef industry by empowering all sectors of the livestock supply chain to realise the benefits associated with electronic identification and information transfer".

To meet this vision, the NLIS objectives will be to—

- significantly improve traceability of pesticide residues and animal health problems which threaten Australia's domestic and export reputation for meat safety

- improve productivity by linking carcase assessment data to individual cattle and sheep, enabling producers, feedlots and processors to identify superior genetics and production practices
- generate efficiencies throughout the value chain by automation of administrative tasks involved in the sale and transport of cattle/sheep and in other areas where traceability is an important issue. (MLA, 2000 in PIRSA, 2003).

Legislative intent

The intent of the amendments to the *Stock Identification Regulation 1985* is to introduce the mandatory elements of the NLIS. The key principles of a national approach to livestock identification and tracing were summarised by PIMC (2003) as—

- a single national system for each terrestrial livestock species
- compatibility across all jurisdictions
- capacity for whole-of-life tracking of animals
- a risk-based approach to the implementation of the system
- qualitative and quantitative system of performance standards
- scope for each system to be enhanced to meet changing consumer and market demands.

The primary purpose of the amendments to the regulation is to assist in the prevention, control and eradication of disease through the capacity to trace potentially diseased stock (including those animals with which they have been in contact).

This capacity comes from all stock that are moved being identified by a radio frequency device with a unique identification number. This number is linked to the location of the animal on the central database. Each movement of the animal to a new location is recorded by electronically scanning the device, then transferring the information to the database.

The system also allows the disease and chemical residue status of individual animals to be ascertained at any stage in the movement and marketing of stock.

This capacity comes from the linkages between the identification devices on the stock and the disease status information in the property registration database. In each state this property registration database is linked to the national NLIS database that records details of the movements of stock.

The tracing capacity achieved through this identification system is in addition to (and may eventually make redundant) the more limited paper-based tracing capacity through waybills under s.22 of the Act and the use of transactions tags under the existing *Stock Identification Regulation 1985*.

The current focus of the regulatory amendments is to allow the introduction of the mandatory elements of the NLIS. However, the amendments will also allow for the implementation of a tracing system for the sheep industry, should an agreed system be developed at a national level.

Consistency with authorising law

Property registration is authorised under the *Stock Act 1915* and provisions in the *Stock Identification Regulation 1985*. Property registration provides the basis for tracing diseased animals in the case of disease outbreaks, and is expected to play a pivotal role in proposed enhancements to biosecurity through NLIS and aspects of plant biosecurity arrangements.

The proposed amendments to the above Regulations will not affect the objectives of the legislation, as the amendments only address the mechanisms by which the activities authorised under the legislation are achieved. There is no requirement to amend the authorising legislation to achieve the objectives of the amendments.

Consistency with fundamental legislative principles

The *Legislative Standards Act 1992* outlines fundamental legislative principles, which require that legislation will have sufficient regard to

the rights and liberties of individuals and the institution of Parliament. The proposed changes to the Regulations have sufficient regard to these principles.

Consistency with other legislation

Agreement has been reached for the provision of a consistent NLIS framework across all states and territories. Implementation timetables have been left to individual jurisdictions, with considerable variance currently existing across each jurisdiction in relation to stages of uptake. With the exception of Queensland, Western Australia and the Northern Territory, implementation of the NLIS has now been instigated across the other states.

Victoria

Victoria is the most advanced of all the states and territories in implementing the NLIS. Mandatory phase-in commenced in January 2002, with all store and breeding cattle now being tagged before leaving a property. All Victorian abattoirs and saleyards must be capable of reading NLIS tags and recording to the database of NLIS tags. From early in 2005 all transactions (including between properties) are to be recorded on the NLIS system.

New South Wales

Mandatory phase-in of the NLIS has commenced from 1 July 2004, with all cattle born after that date to be tagged before leaving property of birth. From 1 July 2005, all cattle are required be tagged and abattoirs, processors and saleyards must also be fully compliant. From 1 January 2006, all transactions (including between properties) are to be recorded on the NLIS system.

South Australia

Mandatory phase-in of the NLIS commenced on 1 January 2004, with all cattle born after that date required to be tagged before leaving the property of birth. From 1 July 2004, all saleyards and abattoirs will

read tags and be able to record information to the NLIS system. From 1 July 2005, all cattle are to be tagged before leaving the property.

Western Australia

Voluntary phase-in of tagging has been endorsed. From 1 July 2004, all WA saleyards and abattoirs will be required to read NLIS identified cattle and record movements on a database. From 1 July 2005, all cattle, other than those consigned direct to abattoirs or for live export and not already identified with an NLIS device, will have to be identified with an NLIS device before leaving any property for any reason. Cattle direct for slaughter or live export will require a transaction tag.

Tasmania

Mandatory phase-in commenced on 1 July 2004, with all cattle born after this date required to be tagged before leaving the property of origin. From 1 July 2005, all cattle not already identified will need to be identified with an NLIS device before movement, and saleyards and abattoirs will need to be proficient in reading tags and recording information on the NLIS system. From 1 July 2006, all transactions (including between properties) are to be recorded on the NLIS system.

Northern Territory

From 1 March 2004, the NT required a mandatory full description of stock to be recorded on the NT waybill and recording of this information on the NT database. Cattle travelling to slaughter or sale within the NT will require a transaction tag while those moving interstate will have to comply with the requirements of the state of destination. From 1 July 2005, mandatory cross branding will apply to cattle moving between properties and changing ownership in the NT.

Alternatives

Why have a mandatory National Livestock Identification System?

A mandatory national traceability system for livestock is essential for Australia to guarantee traceability, especially to maintain its export markets. Given Queensland's strong export orientation, the State is very exposed without such a system in place. A voluntary system simply would not achieve the national traceability performance standards (see Appendix A) to quickly and accurately trace all at risk livestock in the event of a disease incident. This traceability is essential to quickly respond to an incident and regain market access.

The Queensland meat and livestock industries make a major contribution to the State's economy, particularly in regional areas. Some 25 000 people are employed in beef production and processing in Queensland (2001 Census). Queensland's cattle herd consists of around 10.5 million cattle or 44% of the national herd. Around 3.5 million calves are born each year in Queensland. Approximately 1.6 million cattle are aggregated and dispersed each year through some 50 Queensland saleyards.

In 2004–05, the gross value of production from cattle and calves in Queensland is forecast to be $3.085 billion or 30% of Queensland's total Gross Value of Production from agriculture. Queensland exports over 80% of its beef production. These exports are worth approximately $2.6 billion annually, with 73% of this coming from our two major markets, the USA and Japan.

Significant benefits will result from the mandatory implementation of the NLIS. Both government and industry recognise the need to trace the movements of individual cattle to underpin biosecurity, food safety and maintain market access for Queensland's meat and livestock industries is rapidly increasing. Since 1999, the European Union (EU) has demanded individual lifetime identification and traceability for all imports.

Currently Japan is introducing a compulsory system for its domestic cattle and both Japan and the USA demand country-of-origin assurances on imports. This trend is expected to become more insistent in relation to the high-priced markets that Queensland pursues, such as the EU and Japan. In 2003/04, the Japanese market

was worth $1270 million and the USA market $778 million to Queensland.

This reliance on these major markets illustrates the vulnerability of Queensland's meat and livestock industry to any changes in market access or access requirements that may result from the inability to quickly trace diseased (or suspected diseased) animals.

In relation to disease outbreaks, the Productivity Commission estimates that an outbreak of foot and mouth disease (FMD) in Australia could cause a loss in export and domestic market revenue to the livestock industries of approximately $5.7 billion with identified costs of up to $12.8 billion. These effects could last up to 10 years.

An outbreak of BSE would cause losses of similar magnitude with effects also lasting many years. BSE's association with the fatal human condition variant Creutzfeldt Jakob disease has raised international consumer concerns to unprecedented levels. Recent BSE detections in Canada and the USA have graphically demonstrated the widespread and devastating impacts on their economies. They provide useful insights for Queensland, as the State's herd size is comparable to that of Canada.

The Canadian cattle industry was virtually crippled by the detection of a single infected animal in May 2003. It has been estimated to have had a direct cost to the Canadian livestock industry of $3.3 billion plus flow-on losses in rural communities of $1.8 billion, as well as yet un-costed losses in farm value.

The detection of a single case of BSE in the USA on 23 December 2003 resulted in immediate loss of access to over 30 markets, including the lucrative Japanese and Korean markets. The resumption of these markets is still being negotiated with Japan now demanding the USA provide proof that all cattle destined for the Japanese market are less than 21 months of age. Canada and USA are now moving rapidly to upgrade and introduce national systems for permanent identification and lifetime traceability in attempts to reclaim lost markets.

While NLIS will not prevent an outbreak occurring, it is essential that risk animals can be identified and traced as quickly as possible to reduce the duration of a disease outbreak.

There are two variables associated with the implementation of the NLIS—

- whether the system is mandatory or voluntary
- whether there should be alternatives for low risk movements of groups of cattle or should the same system requirements apply to all producers.

Mandatory or voluntary system

A mandatory system has been agreed to by PIMC and implementation is proposed to commence in northern Australia (including Queensland) from 1 July 2005. All other states are working towards implementing a mandatory system. As export markets such as Japan and the USA are expected to impose mandatory requirements in the near future, it is essential that implementation of a mandatory system commence as soon as possible. This will provide security for maintaining Australia's key export markets worth $2.6 billion annually. Mandatory NLIS takes the meat and livestock industry down the path of through-chain traceability, a path that must be taken to maintain market access.

A voluntary system would result in the implementation being driven by commercial forces over an extended period of time and would continue to leave the nation's meat and livestock exports exposed and vulnerable. The Queensland Government would not be able to respond as quickly or effectively to a disease outbreak, which, in turn, would increase the overall cost of an outbreak and delay the return of market access. Further, it would not satisfy the national livestock identification performance standards as agreed to by PIMC.

Given that a voluntary system would fail to deliver on key outcomes, a mandatory system is the favoured approach to underpin NLIS implementation in Queensland. This will ensure an effective and consistent national system.

Phase-in approach for lower risk movements

A significant proportion of cattle in northern Australia (encompassing Queensland, the Northern Territory and part of Western Australia) are sent from property of birth direct to live export or slaughter. These movements are considered low risk in terms of traceability. In April

2003 and May 2004, PIMC agreed that a risk-based approach underpin NLIS implementation in northern Australia.

A risk-based approach recognises low risk movements where cattle may not require individual tagging to maintain traceability, e.g. cattle that travel direct from property of birth to abattoir or export. In Queensland, many cattle are sold in this manner and present lower risks in relation to the ability to accurately trace their movements. Therefore, different traceability solutions may apply in different situations while still satisfying the national requirements of a traceability system.

However, group movements within a mandatory NLIS may weaken the system's integrity and its ability to withstand external audit, thus threatening market access. The processing industry claims to be receiving strong market signals that any variation will not be acceptable to trading partners, particularly Japan.

Additionally, a system where all animals have to be tagged with no variations will be easier to explain to overseas customers, particularly non-English speaking buyers who do not understand the management practices of northern Australia. It will also be seen to be treating all producers, regardless of their size or location, equitably. A risk-based system could be perceived by smaller producers to be favouring larger producers.

There is also the threat that a risk-based management approach will be seen by our trading partners to be inconsistent with the system that will be in place in the southern states of Australia. They may also interpret the system application in the southern states as superior to that in Queensland and redirect their purchasing preferences, making the Queensland industry vulnerable.

Given these considerations, the proposed approach is to implement a mandatory system in Queensland with no exemptions. However, a phase-in approach will be adopted whereby lower risk movements may be recorded in the national database on a group basis for the first two years. Specifically—

- All livestock that move from property-of-birth direct to slaughter or live export will not require a radio frequency identification device (RFID) for two years, but group movements will be recorded on the database.

- All livestock that move from a property, not of their birth, direct to slaughter or live export will not require an RFID device for one year, but group movements will be recorded on the database.

Note that these phase in rules for slaughter cattle only apply to 'over the hooks' sales (i.e. where change of ownership occurs at slaughter) and the movement is of one deck load (22 adult head) or more of a single class of cattle.

Cost benefit assessment

DPI&F engaged Synergies Economic Solutions (Synergies) to undertake an assessment of the costs and benefits to the beef industry of the NLIS. The following sections detailing the costs and benefits of the NLIS are taken from Synergies' report to DPI&F.

Public versus industry benefits and costs

The focus of this study is the assessment of the costs and benefits to the beef industry from the implementation of NLIS. It is important, therefore, that the scope of the costs and benefits to be considered as industry costs and benefits are clearly defined.

For example, there will be benefits to those outside the industry from the implementation of NLIS. In particular, the Queensland Government will benefit from the reduced costs it may incur in the event of a disease outbreak (say, from the reduced duration or intensity of the disease outbreak).[1]

Given the limited alternative uses of much of the land currently devoted to the beef industry, it is likely that a major outbreak could cause severe socio-economic disruption to regions heavily dependent upon the beef industry.

Similarly, the beef industry is such a significant part of the Queensland economy that numerous secondary impacts would arise

1 Project Minotaur estimated that the costs to the Government of a 60-day FMD outbreak to be in the order of $45 million (of which 20% would be recoverable from industry under emergency cost sharing arrangements).

from any major disease outbreak or failure to have Queensland beef accepted in overseas markets.

Indeed, the combination of the significant dependence of the local industry on export markets, together with the difficulty that industry participants would experience in seeking to diversify their activities from beef production, would only exacerbate the adverse 'flow-on' impacts.

In addition, it would be expected that the adverse impacts arising from publicity associated with a disease outbreak could extend to other livestock (and primary) industries, and damage Queensland's reputation as a primary producer. This happened to the livestock industries in Canada following the recent BSE outbreak in that country.

However, the purpose of this report is to assess whether the beef industry is likely to secure a net benefit from the implementation of NLIS and, accordingly, the calculation of costs and benefits will focus on the livestock industry and its supply chain. Consequently, the benefits associated with the full implementation of an NLIS system relate to—

- maintaining access to premium markets
- reducing the duration and intensity of disease outbreak
- improving livestock management and productivity
- reducing the incidence of stock theft.

These benefits are discussed and estimated in the following sections. However, before considering the benefits in detail, the costs associated with the implementation of the NLIS system are reviewed.

1 Costs of NLIS implementation

In this section, the costs associated with mandatory NLIS implementation are reviewed. First, an overview of the methodological issues associated with quantifying the implementation costs is provided. This overview is followed by a sector-by-sector assessment of NLIS implementation costs.

1.1 Overview of implementation costs

The costs of implementing the NLIS in Queensland will be spread across all sectors of the beef and dairy industry. These costs will be borne at different times and with varying frequencies. For example, implementation costs include—

- Capital costs, such as the costs of electronic tag readers. These costs tend to be incurred once every several years (i.e. materially less frequently than annually).
- Annual operating costs, such as the costs of the tags (assuming that the cost of tags is brought to account with that part of the herd which is turned off each year).
- Transactional costs, which at least in theory could be incurred more than once in each year. These include the costs associated with data capture and transfer with each movement of stock.

These cost components must be brought to a common basis for comparative purposes. An annual basis was chosen as the most convenient basis for comparisons with the benefits of the scheme. The cost estimates were derived from a workshop involving DPI&F personnel and convened by Synergies.

The focus has been on identifying the additional costs that are imposed on the industry from the mandatory requirement of NLIS compliance. These are the costs that would be avoided were it not for the imposition of a mandatory NLIS compliance requirement.

For example, producers would not purchase an NLIS reader or buy a computer(s) if compliance with NLIS were not mandatory.[2]

Finally, it is anticipated that the costs associated with NLIS compliance will reduce over time. Several factors are likely to contribute to this average cost reducing over time. These include learning effects, the tendency of technology-related costs to fall over time, and potentially economies of scale resulting in reduced reader and tag costs. For the purposes of this analysis, no allowance has been made for this expected reduction in annual compliance costs. This

2 In addition, a significant portion of the industry has already installed NLIS technology to improve the yield from their operations (an issue to which we return in section 4). In principle, the costs these producers have incurred have little to do with the mandatory requirement to meet NLIS requirements. To the extent that the NLIS costs that these producers incur are included in the analysis, the costs of NLIS implementation will be overstated.

reinforces the suggestion that the approach adopted is relatively conservative.

The following sections address the estimated costs associated with NLIS implementation and ongoing compliance for each sector of the industry.

1.2 Producer costs

The total cost to producers within Queensland for the mandatory adoption of the NLIS, including—

- the cost of NLIS approved devices and associated scanning and reading devices
- NLIS device application and loss rates
- general labour costs for the operation of the NLIS database and data transfer

have been estimated at approximately $26.3 million per annum or around $7.50 per head of livestock sold (refer Table 1). While NLIS costs will vary from property to property, it is estimated that, on average, these costs should be contained within a maximum figure of $7.50 per head sold.[3]

3 The NSW Farmers Association estimates of the costs of the introduction of NLIS are significantly lower than those proposed by the Australian Beef Association. By way of comparison the ABA suggest a total stockowner cost of $37compared with a NFA estimate of approximately $5. Alliance Consulting estimated a range of costs for implementing NLIS depending upon enterprise type, and whether the cattle were sold or used as breeders. The maximum cost of NLIS compliance was $5.77 per head of cattle sold or $4.62 per breeder. The elements included in their analysis were approved devices ($3.50-$5.45); a device loss rate of 1% under normal grazing (approximately 6 cents per year per beast); device applicator, $33.60 as an amortised price over 3 years; third party reading services at $1per head; RFID readers (ALEIS portable wand, $988); NLIS device application, principally a labour cost, at $150per person day; NLIS device reading and database transfer (labour); cost of weight loss and other stress-related losses (See, Alliance Consulting, 2004 pp. 1-6). The NSW Farmers Association has made estimates of the current (2004) costs of implementation and operation for their state. Specifically they estimate the costs of the NLIS tag at $4 (per tag and associated labour costs) and administration costs at $1 million per annum (or approximately 7 cents per head per annum).

Table 1—Estimated annual cost to producers of NLIS implementation

Application	Estimated number of units	Cost per unit per annum ($)	Annualised cost ($000)	Explanation
Electronic tags	3,750,000	3.75	14,062.5	1
Tag replacement	37,500	3.75	140.6	2
Readers	13,000	388.03	5,044.4	3
Back-up readers	1,300	388.03	504.4	4
Computer purchases	1,300	375.68	488.4	5
Internet connection and operation	1,300	1077.00	1,400.1	6
Labour—tag attachment	3,787,500	0.03	113.6	7
Data input handling	3,750,000	0.20	750.0	8
Initial training	52,000	37.26	1,937.4	9
On-going training	5,200	250.00	1,300.0	10
Service and maintenance			554.9	11
TOTAL Annualised cost			**26,296.3**	

Explanation—

1 This is based on an allowance of 3.75 million tags to accommodate annual herd turnoff of 3.5 million and is distributed between those moving from property to abattoir and those being transferred. This provides for around 7% of stock to be tagged but not to be revenue producing (to allow for stock deaths). The average cost of tagging is $3.75 per head based on $3.20-$3.30 per tag (GST exclusive) and relatively generous allowances for handling, the time value of money between the attachment of the tag and the sale of the beast (normally between 1 and 1.5 years) and contingencies. The annual allowance of one tag per beast expected to be turned off a Queensland property each year is intended to capture the tag-related costs for all industry sectors (so that no separate allowance is made for feedlots, for example).

2 Tag replacement assumes 1% of tags will need to be replaced through loss or damage and the same tagging costs as identified in note 1 have been applied.

3 It is assumed that 25% of producers will purchase readers in the first stages of operation at $1000 per reader (as this reflects the fact that only producers moving cattle between properties will require readers). The cost of $388 per annum represents the capital cost of $1000 amortised over an expected life of 3 years with an 8% discount rate. Given that over half of producers have less than 100 head of cattle, this estimate is likely to be at the upper end of the range.

4 It is assumed that approximately 10% of those that purchase readers to meet NLIS requirements will purchase back-up readers (representing 2.5% of the total number of producers). Thus, an additional allowance is made for the purchase of back-up readers of approximately 10% of the initial stock of readers and the annual costs of these readers is calculated in the same manner as the primary readers.

5 Many producers will already have computers. A small percentage (assumed 10%) of those that purchase readers to meet NLIS requirements will also need to purchase new computers as a result of NLIS. The cost of $375 per annum represents the capital cost of $1500 amortised over an expected life of 5 years with an 8% discount rate.

6 A similar number of producers who purchase computers to be NLIS compliant will also take on new or additional Internet connections. Costs based on Telstra broadband (2 way satellite) are $129 set up plus $79 per month for an 18-month contract.

7 Tag attachment costs based on 3 cents per tag. This relatively low cost is due to tag attachment occurring in conjunction with other cattle related yard activities.

8 Data input handling is estimated at 20 cents per head based on the assumption that, on average, each beast is transported once in its life before being processed. It is thought that this assumption is likely to overstate the level of movement of cattle.

9 Training costs are based upon a one-day training seminar ($200 for teaching services and $50 for travel and food). The initial training costs are amortised over 10 years again at an 8% discount rate.

10 The ongoing training is for new staff at a rate of 10% of initial training and assumed to be an annual expense.

11 Service and maintenance charges are estimated to be 10% of capital costs of readers.

Source—DPI&F/Synergies

It should be noted that additional costs of around $5, 000–$15, 000 per producer will need to be invested in scales, readers, computers and software to secure the on-farm productivity benefit available from NLIS. However, these costs have been excluded from the analysis because they do not arise from mandatory compliance with the NLIS.

1.3 Agents' costs

Stock and station agents have expressed concerns over their inability to pass on additional costs associated with NLIS implementation and compliance to other sectors. Agents have also raised concerns that during the phase-in of electronic tags in Queensland, cattle may be sent direct to works in preference to being tagged to be sold through saleyards. It is difficult to assess whether or not this will be the case. It should be noted that it would not affect the total industry costs of implementation.

However, the role of agents remains integral to the system's overall operating efficiency. Costs for agents are estimated in Table 2 to be approximately $120, 000 per annum.

Table 2—Estimated cost to agents

Application	Estimated number of units	Cost per unit per annum ($)	Annualised cost ($000)	Explanation
Readers	154	388.03	59.8	1
Readers—back-up	77	388.03	29.9	2
Initial training	154	74.51	11.5	3
Ongoing training	15	500.00	7.7	4
Service and maintenance			9.0	5
Total			117.9	

Explanation—

1 Based on approximate numbers of active stock agents. Reader cost as for producers as readers assumed to be of the same performance type.

2 A back-up rate of 50% for readers here as reader is vital to business.

3 Training experience as with producers, although twice the number of people per entity attend compared to producers (hence $500 per agent). Initial training costs are amortised over a 10-year period.

4. The ongoing training is for new staff at a rate of 10% of initial training and assumed to be an annual expense.

5 Service and maintenance charges are estimated to be 10% of capital costs of readers.

It is assumed that there are no data inputting costs as these costs will be paid either by producers or by saleyards.

Source—DPI&F/Synergies

1.4 Saleyard costs

It is expected that approximately 51 saleyards across Queensland will require the purchase and installation of readers, together with modification of yards and management. Indications from Victoria and NSW are that many yards will require relatively little equipment if the initial planning is undertaken properly. A number of saleyards in Queensland already have installed equipment or are about to do so.

It is not clear how much upgrading of computer systems will be required, as many saleyards already have computerised information-handling systems. The MLA has made free software available to assist with data transfer. Training may be required primarily in the area of cattle reading and database transfer of information.

It is estimated that the costs of NLIS implementation for saleyards are in the order of $2.4 million per annum (refer Table 3).

Table 3—Estimated sale yard costs of NLIS implementation

Application	Estimated number of units	Cost per unit per annum ($)	Annualised cost ($000)	Explanation
Yard alterations	51	3564.83	181.8	1
Readers	51	5259.59	268.2	2
Readers—back-up	5	5259.59	26.8	3
Labour	1,550,000	1.00	1,550.0	4
Data handling	1,550,000	0.20	310.0	5
Initial training	51	149.03	7.6	6
On going training	5	1000.00	5.1	7
Service and maintenance	51	3564.83	29.5	8
TOTAL			**2,379**	

Explanation—

1 Allowances for modifications for new saleyard infrastructure assumed to be $35,000 per sale yard amortised over 20 years at an 8% discount rate.

2 Readers used by saleyards are likely to be more sophisticated than those used by producers or agents. It is assumed that the average investment for each saleyard is $21, 000 amortised over 5 years at an 8% discount rate.

3 A 10% allowance is made for additional back-up readers. The annual cost of these readers is calculated in the same manner as the primary readers.

4 Labour costs of $1 per beast have been allowed. These costs are likely to fall over time as staff become more efficient with undertaking NLIS related tasks.

5 Assumed average cost of data processing is 20 cents per head.

6 Training assumed to be more extensive than for producers and agents. Initially four person days of training per sale yard at $250 per person per day is allowed, amortised over 10 years (at a 8% discount rate).

7 The ongoing training is for new staff at a rate of 10% of initial training and assumed to be an annual expense.

8 Service and maintenance charges are estimated to be 10% of capital costs of readers.

Source—DPI&F/Synergies

1.5 Feedlot and other facility costs

Many feedlots in Queensland have begun to incorporate NLIS equipment to meet market requirements. Most feedlots have computerised data management, minimising the cost of upgrading to NLIS compliant systems. Software for NLIS up-loads are supplied as part of computer packages to feedlots in almost all cases. A training component for many feedlot staff will be necessary, although many may already be familiar with computerised data management. It is estimated that the costs of NLIS implementation for feedlots involves costs in the order of $600, 000 per annum (refer Table 4).

Table 4—Estimated feedlot costs of NLIS implementation

Application	Estimated number of units	Cost per unit ($)	Annualised cost ($000)	Explanation
Readers	379	500.91	189.8	1
Readers—back-up	38	500.91	19.0	2
Computers	40	375.68	15.0	3
Internet connection and operation	40	1077.00	43.1	4
Data input handling	1,200,000	0.20	240.0	5
Initial training	379	74.51	28.2	6
Ongoing training	38	500.00	19.0	7
Service and maintenance			20.9	8
TOTAL Annualised cost			575	

Explanation—

1 It is recognised that a mix of readers may well be applied and it has been assumed that feedlots will purchase readers in the first stages of operation at $2000 per reader. The cost of $501 per annum represents the capital cost of $2000 amortised over an expected life of 5 years with an 8% discount rate.

2 It is assumed that approximately 10% of feedlots will purchase back-up readers. The costs of these readers are estimated in the same way as for the primary readers.

3 Many feedlots will already have computers. A small percentage (assumed 10%) of feedlots will also need to purchase new computers as a result of NLIS. The cost of $375 per annum represents the capital cost of $1500 amortised over an expected life of 5 years with an 8% discount rate.

4 A similar number of feedlots who purchase computers to be NLIS compliant will also take on new or additional Internet connections. Costs based on Telstra broadband (2 way satellite) $129 set up plus $79 per month for an 18-month contract.

5 Data input handling based on 20 cents per head for approximately 1.2 million head per annum.

6 Training assumed to be more extensive than for producers and agents. Initially two person days of training per feedlot at $250 per person per day is allowed, amortised over 10 years (at an 8% discount rate).

7 The ongoing training is for new staff at a rate of 10% of initial training and assumed to be an annual expense.

8 Service and maintenance charges are estimated to be 10% of capital costs of readers.

Note—Tag acquisition and attachment costs are accounted for in producer estimates.

Source—DPI&F/Synergies

1.6 Abattoir and slaughterhouse costs

All EU abattoirs in Queensland have been equipped to read RFID and transfer data to NLIS databases since 2000. Up to 20 other large abattoirs will need such equipment and computer upgrades. Reading at larger abattoirs will be mostly automated, although it may involve some visual tag reading.

Smaller operators may be able to use hand-held equipment or visually read tags, and transfer data by fax. It is estimated that only five of the smaller abattoirs will require a reader because they generally handle fewer livestock. Some training for use of equipment and database facilities may be required for abattoir and slaughterhouse staff.

It is estimated that the costs of NLIS implementation for abattoirs involves costs in the order of $1 million per annum (refer Table 5). In practice, this figure includes considerable investment that abattoirs would have (and have already) committed, irrespective of the mandatory nature of NLIS requirements and as such is likely to overstate the costs arising from mandatory NLIS compliance.

Table 5—Estimated abattoir costs of NLIS implementation

Application	Estimated number of units	Cost per unit ($)	Annualised cost ($000)	Explanation
Readers—large	20	12,522.82	250.5	1
Readers—small	5	2,504.56	12.5	2
Readers—back-up	3	10,519.17	26.3	3
Data input handling	3,500,000	0.20	700.0	4
Initial training	25	149.03	3.7	5
Ongoing training	3	1,000.00	2.5	6
Service and maintenance			26.3	7
Total annualised cost			**1,021.8**	

Explanation—

1 It is assumed that large abattoirs will invest $50,000 in readers. The cost of $12,522 per annum represents the capital cost of $50,000 amortised over an expected life of 5 years with an 8% discount rate.

2 It is assumed that small abattoirs will invest $10,000 in readers. The cost of $2,504 per annum represents the capital cost of $10,000 amortised over an expected life of 5 years with an 8% discount rate.

3 An additional allowance of 10% is made for back-up readers based on the weighted average cost of readers across the sector. The annual equivalent is calculated by amortising the average on the same basis as primary readers.

4 Data input handling based on 20 cents per head for approximately 3.5 million head per annum. This includes data related costs for slaughterhouses.

5 Training assumed to be more extensive than for producers and agents. Initially four person days of training per abattoir at $250 per person per day is allowed, amortised over 10 years (at a 8% discount rate).

6 The ongoing training is for new staff at a rate of 10% of initial training and assumed to be an annual expense.

7 Service and maintenance charges are estimated to be 10% of capital costs of readers.

Source—DPI&F/Synergies

In addition to abattoirs, there are approximately 70 slaughterhouses operating in this State. These slaughterhouses operate at a considerably smaller scale than abattoirs. It is estimated that the costs of NLIS implementation for slaughterhouses involves costs in the order of $40,000 per annum, noting that data-related costs have been taken into account in abattoir costs above (refer Table 6).

Table 6—Estimated slaughterhouse costs of NLIS implementation

Application	Estimated number of units	Cost per unit ($)	Annualised cost ($000)	Explanation
Readers—large	70	375.68	26.3	1
Readers—back-up	7	375.68	2.6	2
Initial training	70	37.26	2.6	3
Ongoing training	7	250.00	1.8	4
Service and maintenance			2.9	5
Total annualised cost			**36.2**	

Explanation—

1 It is assumed that slaughterhouses will invest, on average, $1500 in readers. In arriving at this average figure, it is recognised that a significant proportion of slaughterhouses process less than 20 head per week and are likely to rely on visual tag reading. Accordingly, the cost of $375 per annum represents the average capital cost of $1500 amortised over an expected life of 5 years with an 8% discount rate.

2 An additional allowance of 10% is made for back-up readers based on the average cost of readers across the sector. The annual equivalent is

calculated by amortising the average on the same basis as primary readers.

3 Training assumed to be more extensive than for producers and agents. Initially one person days of training per slaughterhouse at $250 per person per day is allowed, amortised over 10 years (at an 8% discount rate).

4 The ongoing training is for new staff at a rate of 10% of initial training and assumed to be an annual expense.

5 Service and maintenance charges are estimated to be 10% of capital costs of readers.

Note—Data input handling costs for slaughterhouses are included in abattoir costs.

Source—DPI&F/Synergies

1.7 Other facilities

Feedlots exhibit very similar NLIS compliance cost characteristics with other facilities, namely, the yards that are used in conjunction with the live cattle export trade. Accordingly, for the six facilities used in conjunction with the live cattle export trade, the feedlot costs have been applied to derive an estimated compliance cost of approximately $50, 000 per annum (refer Table 7).

Table 7—Estimated other facility costs of NLIS implementation

Application	Estimated number of units	Cost per unit ($)	Annualised cost ($000)	Explanation
Readers	6	500.91	3.0	1
Readers—back-up	1	500.91	0.3	2
Computers	1	375.68	0.4	3
Internet connection and operation	1	1077.00	1.1	4
Data input handling	200,000	0.20	40.0	5
Initial training	6	74.51	0.4	6
Ongoing training	1	500.00	0.5	7

Application	Estimated number of units	Cost per unit ($)	Annualised cost ($000)	Explanation
Service and maintenance			0.3	8
TOTAL Annualised cost			46	

Explanation—

1 It is assumed that these facilities will purchase readers in the first stages of operation at $2000 per reader. The cost of $501 per annum represents the capital cost of $2000 amortised over an expected life of 5 years with an 8% discount rate.

2 It is assumed that approximately 10% of these facilities will purchase back-up readers. Thus, an additional allowance is made for the purchase of back-up readers of approximately 10% of the initial stock of readers.

3 Many of these facilities will already have computers. A small percentage (assumed 10%) will however need to purchase new computers as a result of NLIS. The cost of $375 per annum represents the capital cost of $1500 amortised over an expected life of 5 years with an 8% discount rate.

4 A similar number of these facilities who purchase computers to be NLIS compliant will also take on new or additional internet connections. Costs based on Telstra broadband (2 way satellite) $129 set up plus $79 per month for an 18-month contract.

5 Data input handling based on 20 cents per head for approximately 200,000 head per annum.

6 Training assumed to be more extensive than for producers and agents. Initially two person days of training per feedlot at $250 per person per day is allowed, amortised over 10 years (at a 8% discount rate).

7 The ongoing training is for new staff at a rate of 10% of initial training and assumed to be an annual expense.

8 Service and maintenance charges are estimated to be 10% of capital costs of readers.

Note—Tag acquisition and attachment costs are accounted for in producer estimates.

Source—DPI&F/Synergies

1.8 MLA costs

Current MLA costs for management of the NLIS database is $850,000 per year and is expected to grow to $1,000,000 per annum under the implementation of a mandatory scheme. This involves ongoing development costs and maintenance of the database (containing records of tags allocated to all properties).

Tag costs and data transfer costs will be carried by those operations responsible for transferring data. Costs cover general administration of system implementation and include audit costs, database management and helpdesk enquiries. The MLA is currently involved in additional implementation activities including setting up and funding of demonstration sites, funding of field staff, attending field days, facilitating workshops and publication of literature.

1.9 Training costs—MLA/DPI&F

The additional costs associated with the implementation will be shared across all stakeholders and are part of the continuous improvement process. These costs are not considered as being of an ongoing nature, but rather a one-off cost involved with implementation of the NLIS. Training costs have been estimated at $750,000 over 2004–05, although the timetable for this expenditure may be impacted by the phasing in of electronic devices by 2007.

However, additional training-related costs are likely to be incurred in the future because ongoing training is required, whether for new staff or as a refresher for staff already trained. A total of $1 million per annum has been allowed in the costs of NLIS compliance to take account of this ongoing training requirement.

1.10 Summary of costs

Based on the foregoing analysis of the annual costs associated with NLIS implementation and compliance for each sector of the industry, it is estimated that the total industry costs will be in the order of $32.5 million per annum (refer Table 8).

Table 8—Estimated NLIS costs to industry in Queensland per annum

Industry sector	Table Reference	Estimate Cost ($ '000)
Producer costs	Table 1	26,296.3
Agents costs	Table 2	117.9
Sale yard costs	Table 3	2,379.0
Feedlot costs	Table 4	575.0
Abattoir costs	Table 5	1,021.8
Slaughterhouse costs	Table 6	36.2
Other facilities costs	Table 7	46.0
MLA		1,000.0
Training costs		1,000.0
TOTAL		**32,472.2**

Source—DPI&F/Synergies

2 Market access

This section considers the impact of loss of market access for Queensland beef producers by not implementing NLIS. It begins by considering the market segmentation that has occurred between premium and lower value export markets. The impact of a loss of access to premium markets is then considered.

2.1 Market segmentation

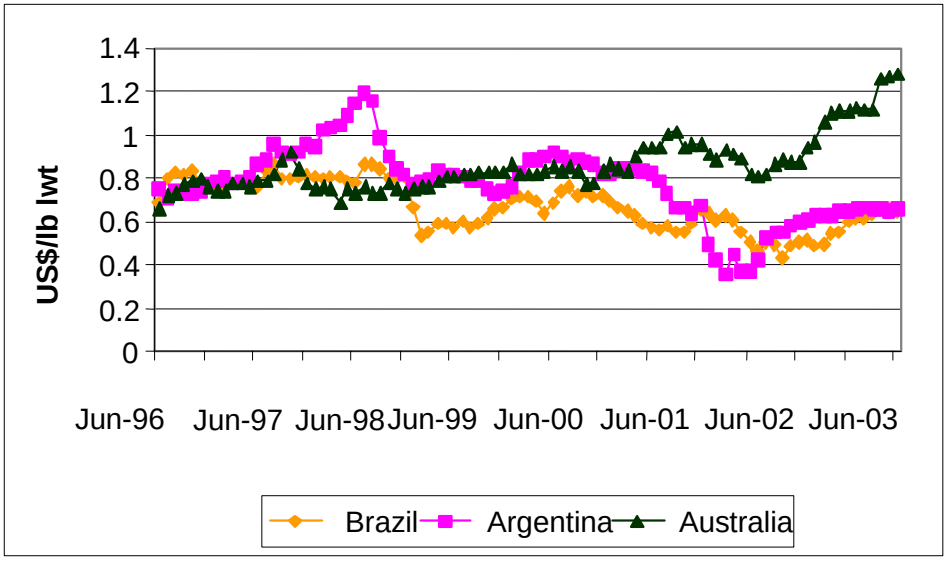
In the absence of the full implementation of an NLIS scheme, exclusion from premium beef markets such as Japan and the EU is certain. A decision not to implement NLIS would be to accept lower market status for Queensland beef in these markets for the foreseeable future.

Examination of the trends shown in Figure 1 indicates an increasingly clearly defined market segmentation occurring between premium and lower value markets. Since 2002 in particular, there has been a growing margin in the prices secured from the premium North Asian, EU and United States markets compared with other markets.

For example, in 1996, average Australian beef export prices were on a par or were slightly below the average prices received by South American countries such as Argentina or Brazil. However, since 2001, the average Australian price has moved ahead of the prices received by the other two countries at an accelerating rate to be 145% of the average prices received by Argentina and 170% of the average prices received by Brazil.

A major contributor to this movement in price differential relates to Australia's greater propensity to trade in premium markets, together with the growing tightness of supply to those markets.

Figure 1—Cattle prices for Australian vs South American beef 1996/03



Source—MLA

It appears that Brazil and Argentina were relatively unaffected by the BSE outbreaks in the United States and Canada. However, the closure of the Japanese market to United States (and, to a lesser extent, Canadian) producers since the outbreak has seen a substantial margin emerge for premium beef producers.

This in turn highlights the market segmentation we are seeing in international markets. The loss of a major producer in the premier market resulted in a price spike, but only existing producers servicing

those premium markets secured the benefits of that spike together with the benefit of increased market share.

However, in the longer term, more complex market dynamics will impact on prices. For example, Uruguay, previously considered an FMD endemic producer, has recently secured access to the United States market. This highlights the intense competition that is likely to emerge for countries to secure access to premium markets. In other words, it is unlikely that the current premiums will persist indefinitely and Australian producers cannot be complacent about their current position in world markets.

This dynamic is illustrated by the increasingly intense competition that is being experienced from Brazilian producers. The Brazilian system of Identification and Certification of Origin for Bovine and Buffalo (SISBOV) provides for a mandatory system of livestock identification. This system has facilitated several regions gaining FMD free with vaccination status that in turn has enabled access into EU markets.

Brazil is currently exporting large volumes of unprocessed beef despite its FMD status.[4] This means that should Brazil secure FMD free status (as seems highly likely in coming years), Australian producers face the daunting prospect of intense competition from Brazilian exports, potentially into premium markets.

For example, the very high levels of Brazilian domestic consumption mean that Brazilian producers will be able to target specific export markets with high value cuts. This potentially provides a competitive advantage for Brazilian producers that Australian exporters may struggle to match.

Indeed, Australia is now falling behind its competitors in livestock identification and tracing systems for cattle. This is illustrated in Table 9. If such an environment persisted indefinitely, there is little doubt that access to premium markets would be threatened.

4 In 1995, 72% of Brazilian beef exports were in processed form. By 1999, this had diminished to 48% and last year the proportion of Brazilian beef exports that were in processed form dropped to just 21% (MLA (2004), Market Information Service, Market Briefs Brazil).

Table 9—International developments in animal identification

Country	Mandatory Scheme	Individual animal based	Whole of life recording	Electronic	Year implemented
Japan	√	√	√	x	2003
Canada	√	√	√	√	2001
European Union	√	√	√	x	1992
New Zealand	√	√	√	x	2000
Botswana	√	√	√	√	2002
Uruguay	√	√	√	√	2004 (planned)
Brazil	√	√	√	x	2003

Source—National Livestock Identification Scheme, NLIS news. Update issue 15, May 2003.

Moreover, there is an emerging domestic market preference for NLIS-identified cattle, reflected as a discount in terms of the relative value of non-NLIS cattle. For store or prime cattle the market preference of buyers is now leaning towards cattle with NLIS identification.

2.2 Implications of a loss of market access

Entry into the premium market is institutionally determined by importing countries Consequently, it is inevitable that only those suppliers with the NLIS system or equivalent will, in future, be eligible to supply these markets. A decision not to implement NLIS is a decision to accept relegation to the lower value beef markets.

The price gap between premium and lower value markets is at historic peaks. However, the long-term trend is that an increasing value is likely to be placed on safe food sources. If a country such as Australia were excluded from premium markets, Australian beef would be forced onto the lower value markets, resulting in a further lowering of prices in those markets. Australian producers are not in the fortunate position of US producers who are able to fall back on the domestic market to absorb much of the surplus beef created by a loss of access for US producers to premium markets. Figure 1 illustrates that prices received in international markets for Australian beef in recent years

had moved well ahead of those for South American beef. The same is true for Canadian beef since the BSE scare in 2003.

Clearly, it is not possible to predict precisely the impact of a loss of access to markets. However, by examining the premiums between markets as well as the differences in prices received across markets in which Australian producers sell into, a sense can be gained of the impact of a loss of access to premium markets.

Examining the data in Figure 1 reveals the following differences in price between Australian and the average of Brazilian and Argentinean beef—

- between January 1999 and December 2003, the price gap was 25%
- between January 2001 and December 2003, the price gap was 37%
- between January 2003 and December 2003, the price gap was over 50%.

Indeed, this analysis will tend to underestimate the impact to the extent that it results in Australia having to sell large quantities of beef into lower value markets. Given that Australia is the world's largest exporter of unprocessed beef, such a scenario must exert significant downward pressure on prices in the lower value markets (and upward pressure on prices in premium markets due to decreased supply), further exacerbating the adverse impact of a loss of market access.

Over the last five years, the annual value of beef exports from Queensland has averaged around $2.5 billion. A 25% reduction in prices received equates to a loss of approximately $625 million per annum in Queensland export earnings.

The potential impact of this may be further seen from examining data relating to trade between Australia and its major beef export markets. These markets include Japan, United States, Korea, Philippines and the Russian Federation. For these purposes, Japan, the US and Korea may be regarded as premium markets. The Philippines and the Russian Federation are markets affected by South American competition and are therefore treated as lower grade markets.[5]

5 For example, Russia is one of Brazil's major markets for frozen beef exports and the low prices secured for Australian beef in this market is in part a reflection of the intense competition between Australian and Brazilian beef.

Table 10 sets out aggregate quantity sold, price and revenue data for chilled and frozen beef between Australia and five trading partners from 1999 to mid 2004. As may be seen, price received differs substantially, ranging from $4702 per tonne (Japan) to $2306 per tonne (Russian Federation).

Table 10—Impact of loss of access to premium markets

Country	Qty (tonnes)	Price per tonne (AUD)	Current revenue (AUD)	Revenue if no access (AUD million)	Total revenue change (AUD million)	% change in revenue if access denied
Japan	320967	4702	1510	752	758	-51
United States	367668	3424	1259	861	398	-32
Korea	79382	3393	269	186	83	-31
Philippines	16849	2382	40	39.5	0.5	-.01
Russian Fed	3744	2306	8	8	0	+.01

Note—Prices refer to aggregate chilled and frozen and are derived from MLA prices 2002–03

In column six (% change in revenue if access denied), all beef sales are assigned a common price of what they would attract if assigned to a lower value market based on the unweighted average of the prices received in the Philippines and the Russian Federation.[6] Overall, receipts fall by 40%, with receipts from Japan falling by 50%.[7]

In this particular example, across these five trading nations alone, receipts from beef exports fall by $1.3 billion per annum for Australia as a whole. Given that Queensland production constitutes over 50% of national production (and around 60% of exports by value), these figures suggest a potential loss of access to premium markets would

6 This price probably overstates the price that would be received if all exported Australian beef were transferred to the lower value market.

7 Care must be taken with this analysis because the products sold into the various markets are not homogenous. For example, the beef trade to Japan may be predominantly chilled whereas a greater proportion of frozen beef may be sold into the Philippines.

cost local producers at least $650 million per annum and may exceed $750 million per annum.

There are a number of ways that the cost of exclusion from premium markets may be estimated. The two methods applied here both suggest that the cost of not implementing NLIS and, as a result, being excluded from premium markets, is very substantial. Given the approaches adopted here, it is estimated that these impacts are likely to be in the vicinity of $625 million and may even be as high as $750 million per annum.

Given that the NLIS will cost the industry around $32.5 million per annum, so long as it delivers a price benefit of a little over 1% it will more than pay for itself. In the context of preserving access to premium markets, there can be little doubt that this will be the case.

Care must be taken with these estimates. In the longer term we are likely to see increasingly intense competition for entry into premium markets. However, this means that failure to implement the NLIS program will only leave Australian producers even more vulnerable to the loss of these markets. Once foreign competitors secure entry into these markets, the consequences for Australian producers are likely to be irreversible, especially if the Australian product is perceived to be intrinsically inferior (from a safety perspective) on account of the absence of tracing attributes. The costs to the industry from a failure to implement NLIS must be considered in this context.

However, the foregone revenue associated with a loss of access to premium markets reflects only a component of the loss Queensland producers would suffer in such an event. Any loss of market access significantly affects the income earning potential of Queensland livestock properties. The vulnerability of Queensland producers to such an outcome is only increased by the limited scope for alternative agricultural enterprises on the land that is devoted to beef production in this State.

3 Impact of disease outbreak

This section considers the benefits of NLIS to reducing the impact of disease outbreaks. It begins by considering the detailed approach that would be applied to quantify such impacts. It then considers the

impacts of disease outbreaks, focusing on recent FMD and BSE outbreaks, and applies a simplified model to assess these impacts.

3.1 Introduction

Disease presents a critical major risk to the Queensland livestock industry with the major threats associated with FMD and BSE. The introduction of NLIS will not only also assist in the containment of outbreaks of FMD and BSE, but also several less dramatic, but nonetheless serious, diseases.

Stock tracking management systems will not prevent the outbreak of disease. However, the development and implementation of the NLIS will allow rapid trace-back and trace-forward of livestock. The recent experience of the BSE outbreaks in Canada and the USA has highlighted the value of tracking systems in identifying the source of the disease and of other animals at risk.

An analogy can be drawn with corporate market reaction to corporate crisis to understand the importance of NLIS in the context of a disease outbreak. In a comprehensive assessment of the impact of corporate catastrophes, Knight and Pretty[8] found that a key consideration to the recovery of lost shareholder value following a catastrophe was the market's assessment of management's ability to deal with the causes and consequences of the catastrophe and the aftermath.

Well-designed and structured responses to incidents provide a means of distinguishing management teams that are well prepared to deal with catastrophes. Translating this corporate experience into the biosecurity sphere means failure to be able to rapidly respond to a disease outbreak (such as through traceability) can be expected to have long-term implications for consumer confidence in the affected industry.

The assessment of benefit from the availability of NLIS is complex. A methodology and worked example is contained in Box 1

8 Knight, Rory F and Pretty, Deborah J, "The Impact of Catastrophes on Shareholder Value, A Research Report Sponsored by Sedgwick Group, sourced from: http://www.scpa.us/Documents/sedgwickreport.pdf. See also Coleman, Les (2004), "The Frequency and Cost of Corporate Crises", *Journal of Contingencies and Crisis Management*, Vol 12, No 1, pp 2-13.

Box 1—Methodology for assessing benefits of NLIS in disease outbreaks

Given the apparent inevitability of disease outbreaks, and given the existence of probability distributions associated with such outbreaks the expected cost of an outbreak is

$EC = P_e \, x\$[LS + RA]$

Where—

EC= expected cost of incidence

LS = lost sales (both domestically and through loss of overseas trade)

RA = associated remedial costs such as loss of stock through death and culling

Both lost sales and extent of remedial action are a function of both the duration of the incident and the intensity of the incident. In other words

LS = f (duration, intensity)

The introduction of an NLIS system impacts upon both the duration of the incident and its intensity.[9] To illustrate this point, examine the impact on trade earnings of an outbreak of BSE in Queensland of severity 1, with the probability of outbreak being established under probability distributions established by DPI&F and assuming that the outbreak lead to cessation of overseas trade in beef for a period of three years. The relevant parameters are—

- estimated probability of outbreak (PE)
- total cost of Outbreak (TC) over a defined period which may be subdivided into loss of overseas and domestic trade (OT&DT) and associated economic activity (AEC).

As well, the total cost is time dependent, being influenced by the duration of the outbreak (duration) and the intensity of outbreak (intensity). It is also likely that duration and intensity and duration are correlated with more intense outbreaks being, on average, of longer duration.

To take a simplified example, assume the outbreak has a 2 percent chance of occurring per time period, and has an associated cost of

9 There is some argument that an effective NLIS system would also help reduce the incidence of disease outbreaks because it promotes better management practices.

$100 million per time period across two duration (time) periods with an associated intensity index of 1.

Expected Cost = PE (0.02) x TC ($2.8 billion) x Duration (2) x Intensity (1) = $112 million.

In the case of an outbreak where the NLIS system is in place, assume that the expected probability of outbreak is the same 2% the potential loss the same ($2.8 billion per time period) but that the NLIS system impacts upon both the duration and the intensity of outbreak. Specifically it reduces duration by half and intensity by 20%. The relevant estimation then becomes—

Expected Cost = PE (0.02) x TC ($2.8 billon) x Duration (1) x Intensity (0.8) = $44.8 million.

In other words, the cost saving from this one example is just under $70 million. Clearly the extent of NLIS-induced loss reductions is sensitive to the estimates of the impact on the system on duration and intensity. While the cost of implementing the system for the whole of Queensland is approximately $32.5 million per annum, the cost savings from this one example alone exceed this amount. On this basis there exists a strong case for arguing that NLIS would pay for itself purely in terms of reducing the costs of any disease outbreak on a one-off basis.[10]

3.2 Foot and mouth disease

3.2.1 Outline of disease

FMD is one of the world's most feared livestock diseases. The disease has not only significantly inhibited livestock development in infected countries but has also resulted in widespread international discrimination against these countries in world trade. Aside from the disruption to production and the loss of valuable livestock, FMD is a trade issue. The occurrence of FMD would result in the immediate loss of export markets for livestock and livestock products.

FMD affects cloven-hoofed animals, in particular cattle, sheep, pigs, goats and deer. While FMD is not normally fatal to adult animals the disease is serious for animal health and for the economics of the livestock industry. The effects are debilitating and cause significant

10 For example, within this single example, assuming 25% reductions in duration and intensity would outweigh the cost of the whole NLIS system.

loss of productivity such as drop in milk production, loss of weight and some animals becoming lame.

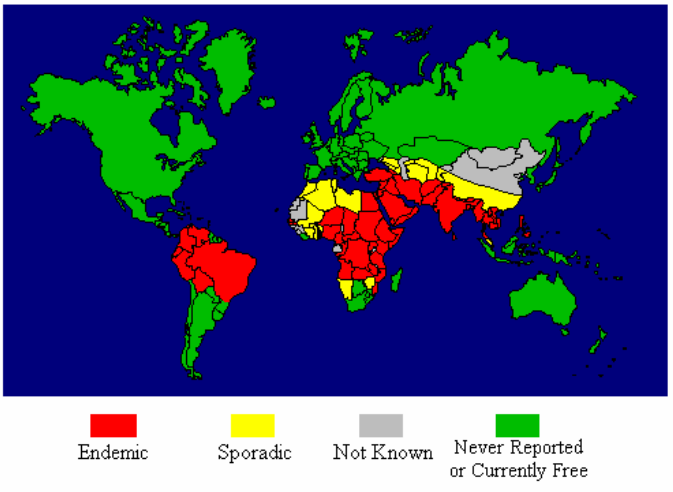
FMD tends to be fatal for young animals and, as a result, threatens the breeding cycle. It is particularly feared because of its extreme infectiousness, and because the only effective treatment against the disease (in the absence of vaccination) appears to be the large-scale destruction and disposal of stock.

The most common means by which the disease may enter a country are through the importation of infected animals, infected animal products (meat, dairy, semen, embryos, wool etc) and mechanical transmission from infected clothing, footwear and equipment.

3.2.2 Brief overview of historical outbreaks

Figure 2 shows that FMD is endemic in many parts of the world. However, livestock identification systems are increasingly enabling relaxation of FMD status. For example, 15 of Brazil's 26 states, representing around 84% of the herd of that country, are declared FMD free with vaccination by the Office Internationale des Epizootes (OIE).[11]

Figure 2—Distribution of FMD



11 MLA (2004), Market Information Service, Market Briefs Brazil.

Of relevance to the Australian situation are the recent outbreaks of FMD in the UK in 2001. This outbreak led to the large-scale destruction of livestock, even though the number of confirmed cases was approximately 2030. The effects of FMD are felt well beyond the agricultural sector.[12] For example, the recent UK experience showed that major impacts were felt in the tourist industry.[13]

The value of Canadian exports subject to international embargo following an unconfirmed FMD scare in 2000 was estimated at over $5.4 billion.[14] AGRI-FACTS, Alberta estimated that after an outbreak of FMD, international trade markets could be shut down for a minimum of 18 months and the clean up would cost billions of dollars.[15] Outbreaks can seriously affect the nation's economy. For example, the Canadian Food Inspection Agency commented[16]—

> *Any outbreak of FMD in Canada would be a national disaster. Failure to recognise and prepare for the damage that the disease could cause to our national fabric would be irresponsible — on the part of both government and industry. Emergency response is the key component of the National Animal Health Program. Effective management requires a comprehensive risk behaviour approach—prevention, preparedness, response and recovery.*

The recent outbreak of FMD in the UK provides the one assessment of the real costs of an FMD outbreak. Two major reports were undertaken by the HMS Treasury[17] and the Department for the Environment, Food and Rural Affairs (DEFRA).[18] The HMS Treasury report on the macroeconomic impact of FMD found that the impact on Gross Domestic Product (GDP) was relatively modest, less than 0.2% of GDP in 2001, but that the real economic impacts often extended far beyond the agricultural sector. Similarly, DEFRA produced the

12 Dent, s (2002). Foot and Mouth Disease Outbreak:Modelling Economic Implications for Queensland and Australia, Department of Primary Industries, Queensland, Information series, Q102035.

13 DEFRA (2002) Costs of Foot and Mouth Disease

14 Canadian Food Inspection Agency (2001) "Summary Of Contingency Measures In The Event Of An Outbreak Of A Foreign Animal DiseaseFoot-And-Mouth Disease.

15 www.agric.gov.ab.ca

16 Op cit.

17 www.hm-treasury.gov.uk.

18 DEFRA (2002) Costs of Foot and Mouth Disease

following table for agriculture, the food chain and tourism (refer Table 11).[19]

Table 11—Sectoral effect of FMD (million pounds) 2001- 2005

Sector	National	Rural	Urban
Agriculture/food chain	-3120		
Compensated by Government	2580		
Direct effect	-525	-525	
Indirect effect	-85		
Tourism range	-4495 to -5340		
Direct range	-2700 to -3205	-1700 to-2015	-825 to-1040
Indirect range	-1835 to -2180		

Source—(DEFRA/DCMS, 2002)

The Productivity Commission estimates that an outbreak of FMD or BSE would cost the Australian economy between $5.7 and $13 billion dollars per annum.[20] In a similar vein the New South Wales Farmers Association claims that[21]—

> *If Australian beef was excluded from the Japanese market it would cost $141 million per month until we could demonstrate that our product was safe to re-enter the market.*

It should be noted that exclusion from the Japanese market may occur even without proven disease outbreaks. Queensland's key customers are now starting to request enhanced identification systems, and such systems are already mandatory for exports to the EU.

19 It should be noted that tourism is less likely to be an issue in Australia.

20 Productivity Commission (2002) Impact of a Foot and Mouth Disease Outbreak on Australia, Research Report.

21 New South Wales Farmers Association, National Livestock Identification Scheme, p1 (http://www.nswfarmers.org.au/__data/page/2965/NLIS.pdf).

3.2.3 Application to Queensland

DPI&F have advised that the assessed probability of an FMD outbreak in Queensland is one in 40 years. The assessed impact of that outbreak is—

- market closure
- slaughter of affected animals
- holding animals because of a stock standstill
- feeding
- loss of herd.

In 2002, DPI&F commissioned a detailed report into the implications of a FMD outbreak in Queensland.[22] The report examined two broad scenarios—

- A long-term outbreak of FMD with the resultant closure from premium (FMD-Free) markets for six years, but not from FMD endemic markets.
- A short-term outbreak of FMD with a resultant closure of all markets for three years.

These two broad categories can be broken down further by assumptions regarding the extent of effective zoning. The report used the Monash Multi Regional Forecast Computable General Equilibrium model to determine industry-wide and macro-economic effects (State and national). It found that the most significant areas of loss were outside the livestock and meat processing industries, in areas such as tourism. Under each scenario it was estimated that—

- The impacts of the long-term market closure would be felt for 15 years.[23] Specifically, the extent of economic loss would peak in year 7, at which time real Gross State Product (GSP) would fall by $2.3 billion, coinciding with a loss of 34,000 jobs. Over the total 15-year period of impact, a total of $9.5 billion would be lost to the Queensland economy.

22 Dent, S (2002). Foot and Mouth Disease Outbreak: Modelling Economic Implications for Queensland and Australia, Department of Primary Industries, Queensland, Information series, Q102035.

23 That is, it would be 15 years before the model predicated that economic activity would return to base line activity.

- Under the short-term exclusion scenario, the impact on the Queensland economy would extend over 10 years, with the most severe economic activity occurring in year 2. In that year alone, real GSP would fall by $1.1 billion below base line and 34,000 jobs would be lost. Total effects (up to and including the third year) approximated a real GSP loss of $2.4 billion.

While all economic modelling must be regarded as approximate, the DPI&F (2002) report clearly shows the major economic loss that would occur following an outbreak of FMD and that the economic impacts of any outbreak are a function of the length of exclusion from markets.[24]

Implicitly, as suggested in Box 1, the economic damage brought by FMD, or any major disease, is a function of both its duration and intensity, but that this joint effect may be represented by variations in duration of exclusion alone.

Similarly, it is best to model the benefits of implementing NLIS through its likely effect in reducing the length of market exclusion. In Figure 3 it is assumed that the impact of a FMD outbreak, in terms of market exclusion, is reduced by nine months (from 18 months) because of implementation of the NLIS system. This may seem an optimistic assumption, however it must be remembered that the reduction in duration is actually being used to model the duration effect and the intensity effect, both of which will clearly be affected by the NLIS.

The duration only approach is also similar to that adopted by the South Australian Primary Industries and Resources Department in its review of the impact of NLIS. This approach also recognises that no accurate estimates of reduction in intensity are currently available.[25]

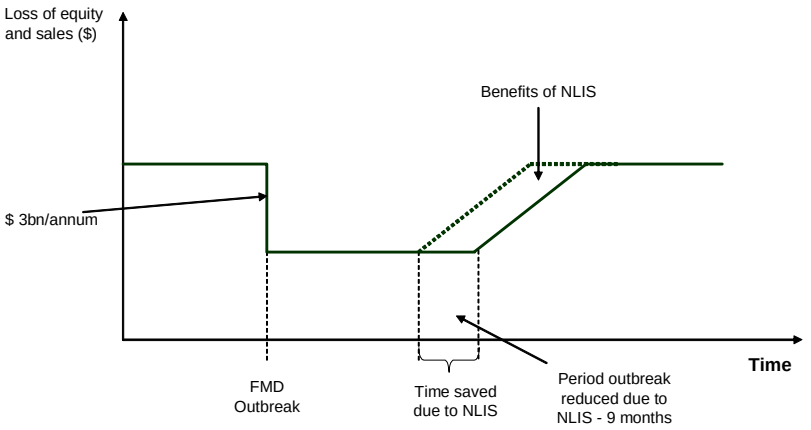
In Figure 3, total costs from the FMD outbreak to the Queensland economy (including the slaughter of diseased animals) from a market exclusion outbreak of FMD are estimated at $3 billion per annum. The impact of NLIS is to reduce the length of the outbreak by nine months. In terms of this particular example, the potential savings from the use of the NLIS system are $3 billion x 9/12 or $2.25 billion. However, an

24 Indeed, to the extent that equity losses in farm values were not explicitly considered in the study, the reported adverse effects on the State economy must be seen as extremely conservative.

25 Primary Industries and Resources SA (2003), Economic Impact Statement Rapid Uptake of Livestock Identification Schemes.

outbreak of FMD is a 1 in 40 event (probability of .025 per annum). Therefore, in terms of the annual expected value, cost savings are estimated at $56.25 million per annum.

Figure 3—FMD impact mitigation from NLIS



3.3 Bovine Spongiform Encephalopathy

3.3.1 Outline of disease

Bovine spongiform encephalopathy (BSE) is a transmissible degenerative disease that affects the central nervous system of cattle. It is a particularly unpleasant disease that leads to widespread destruction of stock and an ongoing reluctance on the part of importing nations to purchase livestock products from suppliers where outbreaks of BSE have occurred. It has links with variant-Creutzfeldt-Jacob disease in humans. Currently it is believed that the agent is a modified form of a normal cell surface component known as a prion protein.

The most likely cause of the initial BSE outbreak in the United Kingdom and elsewhere was through feeding rendered bovine meat and bone meal to young calves following changes in rendering processes. BSE is spread when cattle eat animal feed that contains the mammalian protein from other infected rendered animals.[26] However, it is also likely that the disease appears spontaneously in some cattle.

3.3.2 Brief overview of historical outbreaks

BSE has been detected in 15 different countries, the latest being the USA and Canada. The outbreak was first detected in the United Kingdom in 1986 and spread rapidly. Its progress in the UK is shown in Table 12.

Table 12—Annual incidence rate of BSE in Britain

Year	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total UK	7228	14407	25359	37280	35090	24438	14562	8149	4393	3235	2301	1443	1202	1144	612
Alderney	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
Guernsey	52	83	75	92	115	69	44	36	44	25	11	13	2	1	0
Jersey	4	8	15	23	35	22	10	12	5	8	6	0	0	1	0
Isle of Man	6	22	67	109	111	55	33	11	9	5	3	0	0	0	0
Northern Ireland	29	113	170	374	459	345	173	74	23	18	7	75	87	98	63

Source—OIE, 2004, data as at 30 June 2004.

The number of reported cases peaked in 1992 at over 37,000 and has since steadily declined However, BSE is difficult to detect in young cattle and the disease itself may take between two and eight years to become apparent. The lessons from the UK are that, despite stringent efforts at eradication, BSE was still present in the UK 14 years after its initial discovery.

The disease has spread to a number of other, mainly European, countries. The progress of BSE is shown in Table 13. In most cases the incidence of BSE appears to have peaked in the late 1990s and has since declined.

26 Food and Drug Administration (2003) "When and how did BSE in cattle occur" www.madcow.myWebHealthCenter.com

Table 13—Annual incidence rate of BSE, outside the UK

	Number of indigenous cases per million bovines aged over 24 months														
Country	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Austria													1.0	0.0	0.0
Belgium									0.6	3.7	1.8	5.5	28.2	25.8	10.5
Canada														0.0	0.3
Czech Rep.													2.9	2.5	5.8
Denmark												1.1	6.8	3.4	2.4
Finland													2.4		
France			0.5		0.1	0.3	0.3	1.1	0.5	1.6	2.8	14.7	19.7	21.0	12.0
Germany												1.1	20.0	17.0	8.7
Greece													3.3		
Ireland	4.4	4.1	5.0	5.1	4.6	5.4	4.6	20.3	21.4	20.8	22.8	38.2	61.8	88.4	57.8
Israel														6.3	
Italy													14.1	10.6	9.9
Japan													1.4	1.0	2.0
Luxembourg									10.0					14.5	
Netherlands									1.0	1.0	1.0	1.1	10.3	13.2	10.9
Poland														1.3	1.5
Portugal						15.1	18.8	38.9	37.6	159.4	199.5	187.0	137.9	107.8	137.2
Slovakia													18.3	18.7	6.7
Slovenia													4.3	4.4	4.4
Spain												0.6	24.2	38.0	46.3
Switzerland		1.0	9.2	15.5	30.3	67.6	73.6	48.5	45.4	16.0	58.7	40.6	49.1	27.9	24.9

Source—OIE (2004)

Although still at low levels, concern has been voiced over the progress of the disease in France[27] but the fall recorded in 2003 may indicate that these fears are misplaced. A number of studies have examined the cost of BSE to those nations affected by it.

The most comprehensive was the BSE Inquiry in the UK.[28] The report found that the economic impact from the disease outbreak adversely affected the public and private sectors. The report concludes that one significant and lasting impact was on the domestic consumer demand

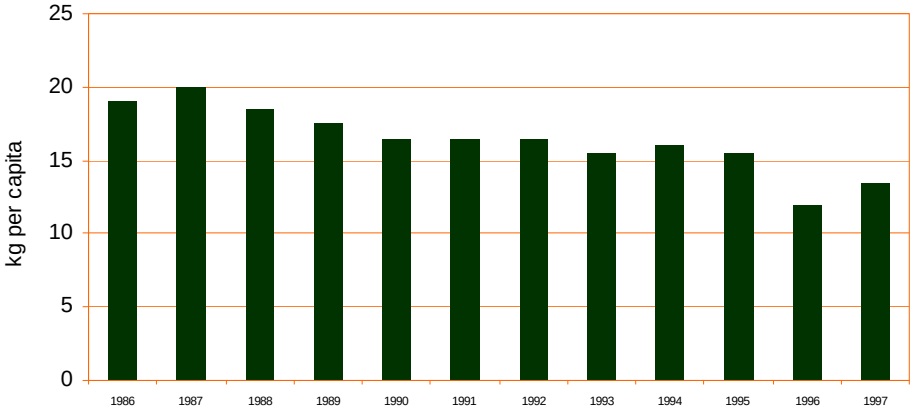
27 New Scientist,(2001), BSE cases in France set to overtake UK, available at http://www.newscientist.com/news/news.jsp?id=ns99991312

28 The BSE Inquiry Report; The Inquiry into BSE and variant CJD in the United Kingdom, www.bseinquiry.gov.uk 2000. Volume 10 of the report specifically dealt Economic Impact and International Trade. Volume 10 of the report specifically dealt Economic Impact and International Trade

for beef, which saw both falling levels of consumption and declining real price indices for beef.

The data in Figure 4 show significant declines in the average per head consumption of beef in Britain over this period.[29]

Figure 4—UK beef consumption per head 1986–97

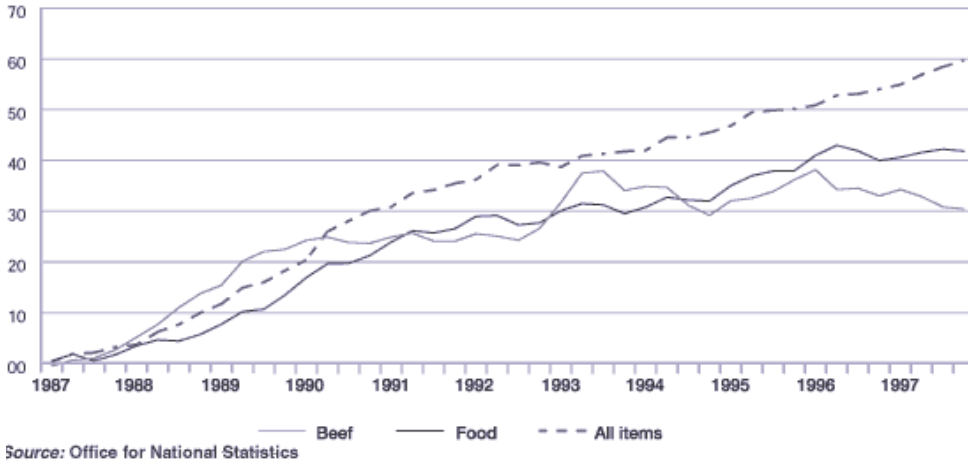


Source—MLC Yearbooks (M44A tab8)

This was accompanied by a decline in prices whereby the trend in beef prices was considerably below the average trend in the retail price index (RPI) (refer Figure 5.)

29 The report argues that the downward trend in beef consumption had already started but that the BSE scare helped accelerate that trend.

Figure 5—The RPI for beef, food and all items UK 1987–97



Source: Office for National Statistics
This chart is based on quarterly figures and all indexes are based to 100 in January 1987

The other areas of economic impact were—

- Public debt (net cost in compensation to farmers of 3.7 million pounds up until 2000/01.
- Loss of export markets (the prohibition by the EU in 1996 of imports of British beef closed an export market worth 600 million pounds per annum).
- Farmers (although largely sheltered in the short run by compensation payments) lost through the development of a two-tier market, where those affected by BSE continue to obtain lower prices for cattle and beef than those not affected).
- Slaughterhouses (additional costs as they now had to dispose of additional waste material), also suffered from the decline in the demand for beef.
- Renderers (needed to re-invent themselves as waste disposal firms that subcontracted to slaughterhouses and knackers).
- Firms to benefit include those supplying quality and inspection services and stock management systems.

Significant though the UK experience is, the BSE outbreak in Canada holds even stronger relevance to Queensland and Australia because, like Queensland, the Canadian industry is heavily dependent upon overseas trade. However, by restricting meat imports Canada has been able to divert product from the export to domestic market. This option

would not be available to Australia as very little red meat is imported, so the effect here would be even more severe.

Indeed, the Canadian experience highlights the attitude of trading partners to any form of BSE outbreak. The Canadians feel that the penalties imposed exceed that recommended by the OIE in terms of 'moderate risk' and 'reporting of first case'.

The outbreak, to this stage restricted to one diagnosed case, resulted in a total ban on all Canadian beef livestock and meat products from May 2003 to August 2004 (Serecon Management Consulting, 2003). Some partial relief was obtained when the US allowed a limited opening of their market for boneless products and hunter harvested animals[30] from September 2003, followed by Mexico, Vietnam and Russia.

The economic loss to the livestock industry in Canada is considerable and set to increase, with the continuing ban on live cattle exports. Estimates of loss by supply chain are shown in Table 14.

Table 14—Impacts in livestock industry from Canadian BSE outbreak

Area of Impact	Cost Estimate Canadian $
Loss in equity in cow-calf sector	$3.0 Billion
Cash loss in cow-calf sector	$547 Million
Cash loss in feeder sector	$192 million
Impact of lost kill credits	$500 million
Loss in dairy sector	$300 million
Loss of live cattle and breeding sales	$700 million
Loss in other sectors (sheep, genetics, veal etc)	$75 million
Loss of meat exports	$1.0 Billion
Total cash loss	$3.3 Billion
Total economic impacts	$6.3 Billion

Source—Serecon Management Consultants (2003)

Apart from the direct loss to the industry, the report identified a number of areas of community and social loss—

30 Assisted by the terms of the North American Free Trade Association

- Decline in rural and public animal health infrastructure which affects the long term viability of small communities.
- Structural problems associated with managing the livestock surplus and insufficient killing capacity.
- Rapid change in rural profile.
- Greater stress on farming and rural population, leading to suicide, depression and abuse.

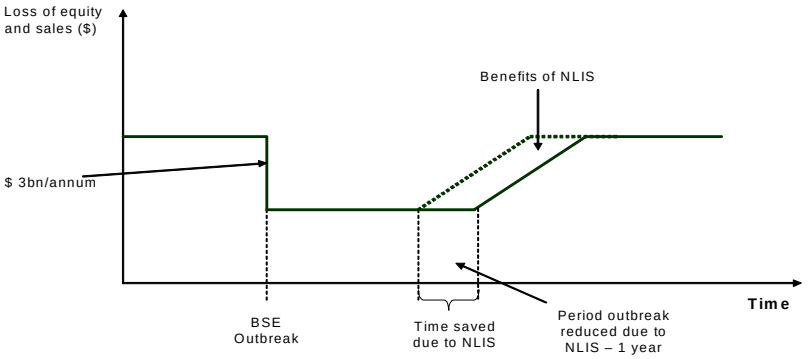
The report also highlighted the fact that the impacts of BSE are not confined to the beef cattle sector but to the livestock industry and the Canadian economy as a whole. It argues that all sectors have suffered a loss of competitive advantage and cites the case of diminished export demand for poultry, sheep and even fish products.

3.3.3 Probability of an outbreak in Australia

By world standards, Australia is currently rated as low-level risk of contracting BSE due to the high proportion of free range grazing and relative low level of feedlot farming. Apart from those nations that have already reported BSE, the UK HMS Treasury has identified South-East Asia, Central and Eastern European countries, the Mediterranean and North Africa as high-risk areas. South East Asia is particularly at risk due to the widespread process of rendering and recycling of animals.

In modelling the benefits of implementing NLIS, Synergies have adopted the same approach as used for FMD (i.e. through its likely effect in reducing the length of market exclusion). DPI&F estimate the likely probability of an outbreak of BSE in Australia at around 1 in 100. In Figure 6 it is assumed that the impact of a BSE outbreak, in terms of market exclusion, is reduced by one year because of implementation of the NLIS system. Again, the reduction in duration is actually being used to model the duration and the intensity effect.

Figure 6—BSE impact mitigation from NLIS



In Figure 6, total costs from the BSE outbreak to the Queensland economy (including the slaughter of diseased animals) from a market exclusion outbreak of BSE are estimated at $3 billion per annum. The impact of NLIS is to reduce the length of outbreak by one year. In this particular example, the potential savings from the use of the NLIS system are $3 billion per year. However, an outbreak of BSE is a 1 in 100 event (probability of .01 per annum). Therefore, the annual expected value of cost savings is $30 million per annum.

3.4 Other benefits

The cattle industry in Australia has been periodically affected by residue incidents involving toxic chemicals and organochlorines (refer Table 15). To ensure the integrity of Australian beef, state and territory governments and the Australian beef industry spend approximately $1.5 million per annum on the National Residue Survey. The survey was established to monitor the trace-back effects of a residue based on the existence of such chemicals within the beef lifecycle chain. NLIS identification for cattle would be expected to improve trace-back from abattoirs to property of origin with a 95% success rate.

Table 15—Major residue incidents affecting the cattle industry since 1987–99

Year	Residue issue	Market affected
1987	DDT & Dieldrin	US
1990	Antibiotics	US, Japan
1991	Penicillin Tick control chemicals	US, Canada North Asia
1992	HGPs	Europe
1993	HGPs Tick control chemicals	Europe
1994	DDT & Dieldrin	US
1995	Cotton trash (Helix)	US, Asia
1996	Endosulphan	US, Asia
1997	BHC (Organochlorine)	Locals
1998	Endosulphan	US, Asia
1999	HGPs	Europe

Source—Primary Industries and Resources SA—Economic Impact Statement "Rapid Uptake of Livestock Identification Schemes"—May 2003

In addition, it can be expected that NLIS will assist with mitigating a range of other disease outbreaks that can adversely affect the livestock industry. There are currently 62 exotic diseases recognised under Government/industry cost sharing arrangements and, of these, several are relevant to the cattle industry. Table 16 lists those diseases that are most pertinent to the cattle industry together with an indication of the extent to which NLIS can be expected to contribute to reducing the cost of incursion.

Table 16—A sample of emergency animal disease relevant to NLIS

Disease	Probability of disease incursion	Cost of an incursion		NLIS contribution to reducing the cost of an incursion
		Lost meat markets	Public health/tourism	
FMD	Medium	High	Medium	High
BSE	Low	High	High	High
Rabies	Low	Low	High	Low
Japanese encephalitis	High	Low	High	Medium
Rift Valley fever	Low	Medium	High	Medium
Rinderpest	Low	Low	Low	Medium
CBPP	Low	Low	Low	Medium
Lumpy skin disease	Low	Medium	Low	Low
Vesicular stomatitis	Low	Low	Low	High
Screw worm fly	Medium	Low	Low	Medium
East Coast fever	Low	Medium	Low	Low
Heartwater	Low	Medium	Low	Low

Source DPI&F/Synergies

4 On-farm productivity benefits

In this section, we consider the scope for on-farm productivity benefits associated with NLIS. The NLIS system will not deliver these benefits, however, the ability to capture data quickly and cost effectively will facilitate a range of on-farm management improvements. In this section the scope of these benefits are outlined followed by an illustrative example of the gains that may be available from genetic improvements to herds over time.

4.1 Scope of benefits

Like any efficient business, livestock producers look for productivity increases in the form of increased yield and time-savings. The implementation of the NLIS, particularly after a suitable phase-in period, will produce a number of definable farm management and productivity benefits. These include—

- carcase feedback, which provides the ability for producers to link individual animals to carcase feedback through the NLIS system
- enhanced on farm identification and management including through—
    - improved recording of relevant stock data
    - improved genetic management
    - improved performance testing of treatments and diet
- accurate and efficient capture and processing of animal weights
- rapid and accurate recording of animal drenches and treatments
- quick identification of animals included in mating mobs
- accurate identification of animals sold
- feed-back linked to sires and dams
- ability to withstand harsh environments
- time-saving and accurate storage of information
- automated management procedures and labour savings.

To attain these benefits, producers must make additional investments of $10,000 to $15,000 to secure the on-farm productivity benefit available from NLIS. This investment will include scales, readers, computers and software. Some producers will invest more heavily than this because they will perceive the incremental benefit from more sophisticated farm management exceeds the incremental cost.

4.2 Scope for NLIS assisted improvements

Producers can attach NLIS tags to the cattle that they breed at anytime before they leave their property of birth. Producers who identify calves at a young age are able to secure the benefit of the NLIS tag as an on-farm management tool.

Producers constantly seek to produce livestock that match with consumer preferences. This involves controlled programs of breeding and herd selection. Effective selection strategies will result in an improvement in the mean performance of the herd, but not the genetic variation within the herd. NLIS increases the scope for this type of improvement through carcase feedback and by allowing the more accurate selection of breeding stock.

The NLIS offers producers the ability to link carcase feedback through the NLIS database, including details such as meat colour, fat content and marbling. This may help cattle producers supply livestock that better meet market specifications for these traits. Reduced variation in a herd can be achieved through targeted management and feeding. Individual identification through NLIS can facilitate these management activities.

In addition, unique identification, with appropriate pedigree recording, can be used to identify superior breeding lines or sires. Where sires are used in more than one herd, pedigree recording and the NLIS systems can add to national genetic evaluation procedures.

The NLIS allows producers to track the types of calves produced by individual stock. This in turn allows producers to determine which cattle to retain for breeding purposes. As each NLIS tag is given a unique serial number, the NLIS system can assist with on-farm record keeping and stock identification.

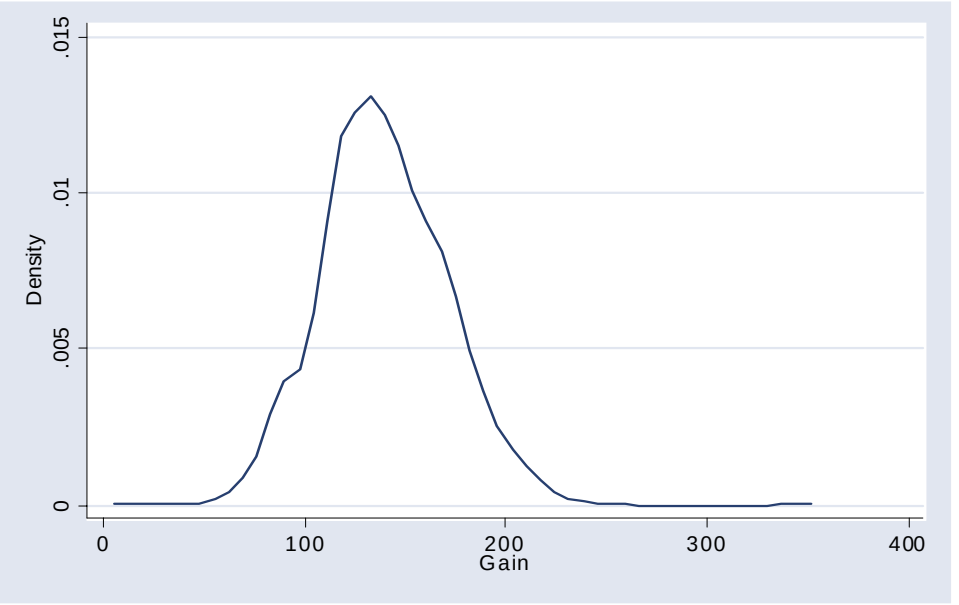
4.3 Quantification of results

The impact of the NLIS system will be largely felt in the area of herd improvement, principally in the quality and quantity of livestock output. In section 4.2 it was shown that lower than expected quality in carcases is a frequent and recurring problem in livestock production. The NLIS system, will allow more efficient herd selection and breeding programs to take place with the result that inferior animals and breeding stock can be culled from the herd.

The potential power of the NLIS system to improve herd performance may be illustrated by examining the variations in weight gain performance among feedlot cattle in Queensland, and testing how this may change if producers were able to improve the overall quality of their herds. The intention is to show how better herd management and selection, using data analysis tools linked to NLIS, can bring substantial improvements in beef production.

Figure 7 Shows the distribution of weight gain among feedlot cattle in Queensland.

Figure 7—Distribution of weight gain (kg)—original series



The original series is slightly skewed to the lower tail, but approximates a normal distribution with those animals in the tail exhibiting lower weight gain. As a result the data have a number of lower tail values. Theoretically, it is possible to raise the average mean weight gain by being more selective of animals to include in the weight gain program (either through additional attention or by culling low performers) and thereby reducing the number of cattle falling into the lower yield area. For example, identification and monitoring through the NLIS allows culling of those types of animal prone to low weight gain and will allow the inclusion only of those animals (or animal types) that have shown a propensity for weight gain in feedlot programs. Genetic selection could also be used to cull those potential parents of progeny that are likely to be under-performers. NLIS has a place in selection programs.

For example, consider the scenario where the current sample of cattle recommence the program but with the lowest 20% culled from the sample. The impact on the distribution of weight gain, assuming all other conditions are replicated, is significant.

Table 17 shows the impact on mean average weight gain under scenarios of 20%, 30% and 40% cull.

Table 17—Impact of assumed yield improvements

Herd selection	Mean weight gain (kg)	% change in weight gain
Original	139.76	NA
Culling bottom 20%	150.54	8
Culling bottom 30%	156.53	4
Culling bottom 40%	159.45	2

Each increase in the culling level of the animals increases (at a reducing rate) the mean average weight gain. This is to be expected as the poor yielding cattle are omitted first. The impact of improving the stock to eradicate yield in the lowest 20% will raise the average mean weight gain by 8%, the marginal increase of moving from a 20% cull to a 30% cull is 4% and from a 30% cull to a 40% cull is 2%.

Altogether, the 20% cull raises the average weight gain by 8% (approximately 12 kg) which translates into approximately $60 per beast.[31] In addition, the facilitation of more intensive management enables less variable and higher quality beef to be produced.

The benefits of higher quality beef (determined by factors such as colour, taste and marbling) are likely to be at least as significant as the benefits of the weight gain. For example, the Queensland Beef Institute has found that the top steers (by carcase traits) received an 80 c/kg net bonus or on average an extra $342 per steer more than the bottom steers.[32]

Clearly, it might be expected that the productivity benefits alone justify implementation of the NLIS. However, there is likely to be a further, more subtle impact. Beef production is undertaken in an internationally competitive market. The productivity gains that are described in this section will be available to all nations (or producers) who adopt the NLIS regime and fully exploit the commercial opportunities it facilitates.

Accordingly, over time, we can expect to see the cost of beef production decline and the quality of beef rise, in line with the gains ultimately being passed through to customers, as can be expected from competitive markets. Failure to take advantage of the

31 Monetary estimates obtained from data supplied by DPI&F.

32 See, Queensland Beef Institute (2004) "Example of variation in performance of 1500 steers in AMH Performance Payment Trial, DPI&F

opportunities systems like NLIS present could undermine the longer term competitive positioning of Queensland producers.

5 Reductions in cattle theft

As all NLIS identified cattle have a link with the producer's property the system provides a means of efficiently monitoring lost or stolen animals. If the animals are subsequently scanned at a saleyard or abattoir, the registered owner of the cattle will be alerted and the appropriate action will be able to be taken. This section considers the benefits of the reductions in cattle theft that might be expected following implementation of NLIS.

Livestock theft has been described as Australia's most significant rural crime.[33] Barclay et al. estimated that the total value of stock loss for Queensland was around $2.3 million per year for 2001.[34] More recent reports suggest that the incidence of livestock theft has been increasing to between $2.5 and $3 million per annum in Queensland.[35]

However, the findings of the most recent National Farm Crime Survey indicate that the incidence of stock theft to be in the order of 1 per 1000 head of cattle, suggesting that over 10,000 head of cattle may be stolen from cattle properties in Queensland each year.[36] Assuming that the value per stolen beast is $500, then approximately $5 million of cattle are stolen from Queensland properties each year.

The rate of theft has increased in recent years as a result of the rising price of meat and the strong position in the international market held by Australian beef. The average loss from livestock theft in 2001 was over $9000 per annum per property, but losses of up to $70,000 have also been reported.[37]

---

33 Stephenson, W (2003) Livestock Theft in Australasia, Australasian Centre for Policing Research, No. 6.

34 Barclay, E. (2001) "Property crime victimisation and crime prevention on farms", Report to the New South Wales Attorney Generals Crime Prevention Division, Institute for Rural Futures, University of Arm dale.

35 Limb, J (2001) Stock theft on the rise: Landline, 21 April, Australian Broadcasting.Commission.Online ww.abc.net.au/landline/stories/s279004.htm, http://www.abc.net.au/stateline/qld/content/2004/s1181642.htm.

36 Australian Institute of Criminology (2003) Results from the 2001–2002 National Farm Crime Survey, Report No 226 available at

http://www.aic.gov.au/publications/tandi2/tandi266.pdf.

37 Ibid.

5.1 Incidence of theft

Police identify two groups of cattle thieves—

- professional
- opportunistic.

Professional thieves are generally well organised, steal in large numbers and normally have a ready market for the stolen cattle. Opportunistic thieves steal livestock to boost their own herds, improve bloodlines or economic sustainability and normally take unbranded or unmarked stock. It has been estimated that 70% of livestock thefts are committed by persons who live nearby.

For a number of reasons, the incidence of stock theft tends to be significantly under-reported, especially in Queensland, where only 47% of actual cases are reported to police, compared with 49% of cases in NSW.[38] For this reason, incidence of theft data in Table 18 should be regarded as a minimum estimate.

Table 18—Estimates of the incidence of stock theft

State or territory	% farms livestock theft
New South Wales	8
Northern Territory	12
Queensland	6
South Australia	8
Tasmania	5
Victoria	7
Western Australia	14
Australian average	8

Source—Farm Crime Survey, AIC (2002)

5.2 The impact of NLIS on cattle theft

As insurance for general livestock is normally unavailable to farmers and recovery rates are low, farmers tend not to report minor incidences. However, behind the low recovery rate (and possibly the

38 Ibid.

lack of insurance cover) is the often inadequate branding and stock identification systems in place. Stock identification and stock movement requirements differ across states. Barclay argues that[39]—

> *The level of detail required for stock movement paperwork varies between jurisdictions and often provides inadequate descriptions of stock.*

Stephenson identifies a system for tracking stock movements as being essential in reducing the incidence of stock theft, with initiatives such as the NLIS being important in tightening up stock security and reporting, and improving recovery rates[40]—

> *The good news for police is that, with technology advances and international pressure, we are already witnessing a move towards the better identification and tracing of stock.*

The NLIS system is seen as being particularly important in reducing professional theft and it greatly increases the chances of detecting large-scale movements of stolen stock. Vulnerable stock can be tracked using the bolus that will be very difficult to remove from the beast.

5.3 Quantification of stock loss benefits

The potential savings in reduced stock loss as a result of the introduction of NLIS relate to a number of factors such as—

- The distribution of stock theft between professional and opportunistic, in that a NLIS-type identification scheme is much more likely to prevent large scale theft and re-sale
- The extent of reporting of theft by producers. NLIS should increase the reporting (and hence clear-up rate) rate by producers as they are much more able to track their stock.
- An increase in the active participation of stockyards and abattoirs in identifying stolen stock.

Assuming a reduction in cattle theft of 50%, the potential savings to producers across Australia, from the utilisation of the NLIS is conservatively estimated at between $1 million and $2.5 million per annum.

39 Ibid, p. 102
40 Op cit, p 6.

6 Summary of impacts

The NLIS system is expected to provide benefits to the Queensland industry of at least 10 times and possibly in excess of 20 times the annual costs the system will impose on the Queensland beef industry. These annual costs are expected to be approximately $32.5 million per annum). The benefits that industry is likely to secure arise from—

- Maintaining access to premium markets which, over the past five years, have generated a premium of around 25% relative to lower value markets as market segmentation has become more pronounced. Applying this premium suggests that the annual cost to the Queensland beef industry of being excluded from these markets could be as high as $625 million. Given that the NLIS will cost the industry around $32.5 million per annum, so long as it delivers a price benefit of a little over 1% it will more than pay for itself. In the context of preserving access to premium markets, there can be little doubt that this will be the case.
- Reducing the duration and intensity of disease outbreaks. A simplified model has estimated that the annual savings to industry are in the order of $85 million per annum.
- Improving farm management, which could yield (short-term) gains in the order of $50 per beast (noting that this premium is likely to be eroded away and be manifested in longer term price reductions).
- Reducing the impact of stock theft (between $1.5 million and $2.5 million per annum).

While it is important to recognise that these estimates have been made with high level data and at times simplified models, it is clear that the gains to the beef industry are substantial relative to the cost imposition.

It is true that the cost burden of NLIS implementation falls predominantly on beef producers as opposed to other links in the value chain. Nevertheless, producers would benefit the most from any surplus that emerges from NLIS implementation.

In reality, Queensland livestock producers cannot avoid and cannot afford not to implement a comprehensive NLIS system. Failure to do so will lead to the industry prejudicing its competitive position in international markets.

In the longer term, the industry is likely to experience intensifying competition from exporting nations to secure access to our premium markets. Uruguay has already secured access to the United States market. Failure to implement NLIS will leave our industry increasingly vulnerable to these attacks.

In summary, the NLIS system represents a relatively cost-effective insurance mechanism for the industry. It is clear that the beef industry can be expected to benefit sufficiently to fully fund those elements of the system that are currently proposed.

7 National Competition Policy

The Queensland Government is a signatory to the National Competition Policy agreed to by the Council of Australian Governments in 1995. Essentially the policy is that legislation should not restrict competition unless it can be shown that the benefits to the community of the restriction outweigh the costs, and that the objectives of the legislation can only be achieved by restricting competition.

The NLIS imposes additional requirements on those operating within the cattle industries. The previous sections outlined in some detail the costs and benefits associated with the introduction of the mandatory NLIS.

From this information it is possible to conclude that the benefits to the community, in particular the cattle industry, significantly outweigh the costs. The RIS also outlines why the proposed mandatory NLIS is the only means by which all of the policy objectives of a national traceability system for livestock can be adequately addressed and achieved (see Section on Alternatives). Hence, the introduction of a mandatory NLIS is consistent with the principles of the National Competition Policy.

8 Risk assessment

Major assumptions relating to introduction of the NLIS are outlined in Table 19.

Table 19—Risk assessment

Assumptions	Risk analysis	Strategy
NLIS data transfer operates effectively.	Technical problems—data readers; upload of data to national data base.	MLA has received federal funds, database being upgraded.
NLIS equipment functions effectively.	Equipment unreliable under harsh, dusty conditions.	All NLIS devices must meet national performance standards.
Costs of implementation are as estimated.	Costs exceed current estimates.	DPI&F continuously monitoring likely costs. Conservative approach was taken to estimation of industry costs (i.e. costs used were on the high end of expectations).
Infrastructure is in place at saleyards and abattoirs to commence reading by 1 July 2005.	Insufficient readers (inadequately trained personnel) at saleyards.	DPI&F implementing Saleyard Rebate Scheme and technical support. MLA providing workshops and tours of operating saleyards for Queensland saleyard owners and agents.
Producers aware of obligations under NLIS.	Producers may not understand the phase in requirements.	DPI&F and MLA providing communication and training activities for producers. DPI&F and MLA providing demonstration sites with working examples.
Adequate supply of tags and readers, from manufacturers (especially close to 1 July 2005).	Delay in manufacture of race readers for saleyards and abattoirs.	DPI&F encouraging early ordering of equipment.

Assumptions	Risk analysis	Strategy
Both tags and boluses can be used.	Abattoirs refuse to process cattle with bolus devices.	MLA carrying out R&D for recovery of boluses in abattoirs.
Most states working towards implementation on 1 July 2005.	Delay in introduction of mandatory NLIS in NSW or NT may affect cattle crossing state borders.	Ongoing liaison with interstate authorities.
Beef market signals continue to indicate growing emphasis on individual ID.	Overseas markets accelerate required level of ID.	Some components could be fast tracked if required.
No major disease outbreaks occur.	A disease outbreak increases urgency of implementation.	Continue to ensure existing system is working as effectively as possible.
Enforcement/compliance	Insufficient compliance staff available	Use risk management approach to compliance
QNIC maintains cross sector support.	QNIC unable to agree on key areas and disbands.	DPI&F facilitates discussion with QNIC.

Delays in the implementation of the proposed Regulations would not only delay the implementation of the NLIS, but would place at risk the implementation of a range of enhancements to Queensland's biosecurity arrangements.

References

PIMC 2003, *Report of the Industry/Government High Level Advisory Group on Livestock Identification and Tracing*, Agenda Paper.

Primary Industries and Resources South Australia (PIRSA) 2003, *Economic Impact Statement "Rapid Uptake of Livestock Identification Schemes*".

Queensland NLIS Implementation Committee (QNIC) 2004, *National Livestock Identification System (NLIS) Draft Queensland Implementation Plan for Cattle*.

Synergies Economic Solutions 2004, *The implications for the Queensland beef industry from NLIS implementation*—A report to the Queensland Department of Primary Industries and Fisheries.

Appendix A—National performance standards

Table 20—National performance standards

Applicable to all FMD susceptible livestock species[a]	
1.1	Within 24 hours of the relevant CVO[b] being notified,[c] it must be possible to determine the location(s)[d] where a specified animal was resident during the previous 30 days.
1.2	Within 24 hours it must also be possible to determine the location(s)[d] where all susceptible animals that resided concurrently and/or subsequently on any of the properties on which a specified animal has resided in the last 30 days.
Applicable to cattle only[e]	
2.1	Within 48 hours of the relevant CVO[b] being notified[c], it must be possible to establish the location(s)[d] where a specified animal has been resident during its life.
2.2	Within 48 hours of the relevant CVO[b] being notified[c], it must be possible to establish a listing of all cattle that have lived on the same property as the specified animal at any stage during those animals' lives.
2.3	Within 48 hours of the relevant CVO[b] being notified[c], it must also be possible to determine the current location[d] of all cattle that resided on the same property as the specified animal at any time during those animals' lives.
Applicable to all FMD susceptible livestock species except cattle (Lifetime traceability excluding the preceding 30 days—addressed by 1.1 and 1.2, above)	
3.1	Within 14 days of the relevant CVO[b] being notified[c], it must be possible to determine all locations[d] where a specified animal has been resident during its life.
3.2	Within 21 days of the relevant CVO[b] being notified[c], it must also be possible to determine the location[d] of all susceptible animals that resided concurrently with a specified animal at any time during the specified animal's life.

a For the purposes of the Standards, 'FMD susceptible species' means cattle, sheep, goats, and domesticated buffalo, deer, pigs, camels and camelids.

b 'The relevant CVO' means the State or Territory Chief Veterinary Officer, or their delegate, in the jurisdiction where the specified animal is located or has been traced to.

c For the purposes of these Standards, the term 'notified' means the relevant CVO is aware of an incident that required tracing.

d ‘Location’ means any definable parcel of land including (but not limited to)— any parcel of land with a Property Identification Code, travelling stock routes, saleyards, abattoirs, feedlots, live export collection depots, show grounds, Crown land and transport staging depots.

e Given the risks posed by BSE, it was considered appropriate to establish separate Standards for cattle.

ENDNOTES

1 Laid before the Legislative Assembly on . . .

2 The administering agency is the Department of Primary Industries and Fisheries.